

***United States Court of Appeals
for the Second Circuit***



APPELLEE'S BRIEF

75-7362

To be argued by
PAUL R. GRAND

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United States Court of Appeals

For the Second Circuit

P/S

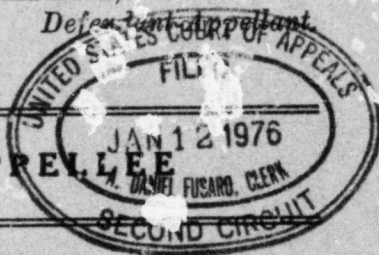
PERMA RESEARCH & DEVELOPMENT COMPANY,
Plaintiff-Appellee,

v.

THE SINGER COMPANY,

Defendant-Appellant.

BRIEF OF APPELLEE



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United States Court of Appeals

For the Second Circuit

Docket No. 75-7362

PERMA RESEARCH & DEVELOPMENT COMPANY,

Plaintiff-Appellee,

v.

THE SINGER COMPANY,

Defendant-Appellant.

BRIEF OF APPELLEE

Questions Presented

1. Were the District Court's findings as to
 - (a) Intent of the parties
 - (b) The perfectibility of the Perma device
 - (c) Damages

so lacking in evidentiary support as to be clearly erroneous?

2. Were the District Court's evidentiary rulings of which appellant complains so erroneous as to amount to an abuse of discretion requiring reversal or remand?

Plaintiff-appellee respectfully submits that both questions should be answered in the negative.

Statement of the Case

Preliminary Statement

This is an appeal by defendant, The Singer Company ("Singer"), in a diversity action for breach of contract from a decision (unreported) of the United States District Court for the Southern District of New York (Duffy, J.) and the judgment entered thereon on June 3, 1975, as amended June 16, 1975 (R. 132, 136, 142)¹ after trial without a jury, and from the decision and order of the Honorable Lloyd F. MacMahon, United States District Judge for the Southern District of New York, which denied one of defendant's several pre-trial motions for summary judgment (R. 61), 308 F.Supp. 743 (1970).²

Singer's appeal represents the latest stage in the ten-year history of this litigation. It follows three separate Singer motions for summary judgment, in which Singer contended that there were no triable issues of fact, a trial which spanned a period of 8 months, an enormous record which includes a trial transcript in excess of 8,000 pages, several hundred exhibits, and several thousand additional pages. There is no federal question nor is there any sig-

1. Citations to designated portions of the Record on Appeal other than the Opinion of Judge Duffy, the trial transcript, and exhibits will be preceded by "R." and located in Volume I of the Joint Appendix. Citations to Judge Duffy's Opinion, located in Volume I of the Joint Appendix, will be preceded by "Op.". Citations to designated portions of the trial transcript, located in Volumes II-IV of the Joint Appendix, will be preceded by "Tr.". Citations to designated plaintiff's exhibits, located in Volumes I-III of the Exhibit Binder, will be preceded by "PX". Citations to designated defendant's exhibits, defendant's exhibits for identification, and Court's exhibits, located in Volume III of the Exhibit Binder, will be preceded respectively by "DX", "DX for id.", and "Ct.X". Since many exhibits do not have serially numbered pages, all exhibit pages, regardless of internal pagination, have been numbered consecutively beginning with the first page of the exhibit. Citations to exhibit pages will be in accordance with this numbering. Singer's brief is cited "S. Br.".

2. Plaintiff-appellee is not pursuing its cross appeal filed July 2, 1975, from a portion of the District Court's computation of the amount of damages awarded.

nificant question of law raised on this appeal or for that matter involved in this case. Singer essentially quarrels with certain of the District Court's findings of fact, its computation of damages, certain evidentiary rulings and its determinations as to the credibility of witnesses, including the parties' respective expert witnesses.

The District Court awarded damages in the amount of \$5,333,423.94 with interest in the amount of \$1,564,873.43 (R. 142), and costs amounting to \$20,728.00 (R. 143). The judgment is based on clearly substantiated findings by the trial court that Singer breached its contractual obligation to use its best efforts to perfect, manufacture and market an automotive anti-skid device (Op. 4, 40) covered by patents assigned to Singer in December, 1964,³ by Perma, a "financially distressed" company with a "negative balance sheet" (Op. 15). The trial judge further found that the evidence adduced at trial "totally demolishes" Singer's counterclaim and affirmative defense (Op. 16), and that "both the counterclaim and affirmative defense raised by Singer are sham" (Op. 18). He further found that much of what Singer did before abandoning the contract "was merely a charade staged in contemplation of the possibility of litigation" (Op. 28); and that certain issues raised by Singer "were really a smoke-screen to needlessly delay the resolution of this litigation and to harass the plaintiff and this Court" (Op. 37-38). Singer does not complain of these findings on this appeal.

The findings of fact, evidentiary rulings and computations of damages of which Singer does complain are all amply supported by substantial evidence and in no event meet the test of being clearly erroneous. They have been clearly established by plaintiff after ten years of litigation and eight months of trial in a case which, as the District Court has said, "has had a long and tortured history" (Op. 1).

3. Singer at or about the time of the December, 1964, contract was a company with almost a billion dollars of annual sales (Op. 6), \$844 million of assets (PX 144 at 4, 30), 15 research and development laboratories. It employed 2,200 scientists, engineers and technicians, and had net earnings of \$44 million a year (Op. 19, 20).

Prior Proceedings

Pursuant to a contract dated December 21, 1964 (the "December contract"), Singer acquired the patent rights in the anti-skid device invented by Perma's president, Frank Perrino. It agreed, among other things, to pay royalties to Perma for ten years on sales of the device and an advance against future royalties. The written contract, drafted by Singer's attorneys, failed to specify precisely what steps the parties intended Singer to take to bring the product to market, although a "technical services contract" executed on the same day made clear that further engineering work was contemplated (Op. 19).

On Singer's first motion for summary judgment, the District Court (Bryan, J.) held that the December contract (there having previously been an earlier contract entered into between the parties on June 18, 1964 (the "June contract")) [see pp. 10-11, *infra*], imposed upon Singer an obligation to use its "best efforts to manufacture and market" the device, and that the complaint stated a cause of action for breach of that obligation (R. 18), *aff'd*, 410 F.2d 572 (2d Cir. 1969). Singer moved for reargument of Judge Bryan's determination contending that its only duty was to market and promote the product beginning in 1966 and that it was therefore entitled to abandon the contract in 1965.

After Judge Bryan adhered to his original decision on reargument (R. 28), Singer again moved for summary judgment and, as Judge MacMahon noted, "Singer made the precise arguments, cited the same authorities, and presented the identical facts now urged on this second attempt for summary judgment in its favor." R. 61; 308 F.Supp. at 743, 745, 746 (S.D.N.Y. 1970). Nonetheless, Judge MacMahon considered anew the substance of Singer's motion and denied it, holding that, in his view, Singer's duty to use its best efforts to manufacture and market the device in

light of the circumstances meant that Singer was required to "continue to collaborate with Perma for a reasonable length of time in a good faith effort to resolve the problems then preventing marketing of the product." 308 F.Supp. at 748. Accordingly, he defined the following as the principal issue for trial: "Did Singer use its best efforts for a reasonable time in collaboration with Perma to perfect the product" in order to be in a position to market it? 308 F. Supp. at 749.⁴ Thereafter Singer, in the course of proceedings in connection with the fashioning of a pre-trial order, advanced the same argument before Hon. Edward C. McLean, who followed Judge MacMahon by similarly defining the issue for trial (R. 53).

With characteristic tenacity, Singer argued this question again to Hon. Kevin T. Duffy, to whom the case was assigned after Judge McLean's death. He independently reached the same conclusion as Judges MacMahon and McLean, and signed a pre-trial order to that effect (R. 102 at 1). Nevertheless, at trial, Judge Duffy "permitted [Singer] extraordinary latitude . . . to prove all that it could and to make any argument it wished" (Op. 4) not only on the issue of whether Singer used its best efforts but also whether it was obligated so to do under the contract.

Singer accordingly devoted a major portion of its case to evidence, including evidence of "questionable probative value" (Op. 4), intended to support its construction of the contract as not imposing the obligation here sued upon. This is a principal thrust of its argument on appeal (S. Br.

4. Singer then moved for summary judgment a third time, contending that the complaint should be dismissed because Singer had been induced to enter the December contract by Perma's alleged misrepresentation that its device was fail-safe. This motion was denied by Hon. Charles M. Metzner holding "it is perfectly obvious from the record and the prior opinions that defendant could not have been under any delusion that the product was fail-safe . . ." (R. 69 at 4)

15-31). Alternatively, Singer argued below and maintains on appeal that as a matter of fact it was justified in abandoning the device since it was not "perfectible" in that it could not be made to satisfy Singer's subjective and self-serving standard of "absolute fail-safety," a standard which the trial judge found "was . . . an impossible standard" enunciated by a Singer official who arbitrarily determined "to get rid of the Project on the very first day he saw it" (Op. 27). *See also* Op. 36-37. Extensive testimony including extensive expert testimony was offered by both sides on the issue of the perfectibility of the device. The trial court found "that Singer gave inadequate funding to the entire program and staffed it with inept and inexperienced people who were unable to even understand the problems, much less cope with them" (Op. 22), that Singer did not use its best efforts to perfect the device despite its obligation to do so (Op. 40), and that the device "was perfectible and could have been marketed" (Op. 44).

The District Court awarded damages based on applying the royalty provisions of the December contract to Singer's own projections of sales volume during the term (Op. 50-58).

Statement of Facts

Singer's Statement of Facts (S. Br. 2-14) omits, and in some instances affirmatively misstates, facts in the record which support the trial court's findings, in four critical areas: (A.) What Singer knew about the nature and characteristics of the Perma anti-skid device before entering into a contract with Perma on December 21, 1964 (S. Br. 6-8); (B.) The contemporaneous expectations in December, 1964 of the contracting parties concerning what remained to be done before the device would be ready for market (S. Br. 8-9); (C.) What actually remained to be done as of December, 1964, specifically including the alleged need for "redesign" and the real reason Singer abandoned the contract (S. Br. 9-11, 13-14); and (D.) Perma's damages (S. Br. 11-12). This Statement of Facts is therefore necessary to correct and supplement Singer's inaccurate and incomplete presentation of these points. We, of course, do not attempt to rehearse all the evidence developed in the course of the eight month trial and reflected in the 8,000 page transcript and more than 350 exhibits.

A. What Singer Knew About the Nature and Characteristics of the Perma Anti-Skid Device Before Entering Into the December Contract

Summary

Perma held patents for its anti-skid device (Op. 12; PX 8-13, 150) and struggled on its own meager resources to have it manufactured and marketed until January, 1964, when Singer's representatives witnessed a demonstration in Canada and initiated negotiations to obtain the manufacturing rights thereto (PX 14, 15; Tr. 182, 284-87). These negotiations led initially to a contract between Perma and Singer dated June 18, 1964 (the "June contract"). Pursuant to that contract, Perma retained its patent rights but granted Singer an exclusive license to manufacture anti-skid units incorporating the concepts described in Perma's patents (PX 35). After Singer encountered nu-

merous design and engineering problems with the mass-produced hardware of the anti-skid device (discussed in detail below at pp. 11-15), and further negotiations between the parties, the June contract was superseded on December 21, 1964, by the contract (the "December contract") which is the subject of this appeal (PX 60A, §7 at 12).

Events Leading to the Initial Contract of June, 1964

In discussing the communications between the parties which preceded the June contract, Singer mentions only certain representations made by Perma at a February, 1964, meeting and subsequent pre-June meetings as to the "fail-safe feature" of the Perma device and its state of "perfection" (S. Br. 6).⁵

At the February meeting, Singer representatives, including Robert Kloby,⁶ whom Singer later placed in charge of the Perma project (PX 63; Tr. 6158-60), visited Perma's facilities at North Attleboro, Massachusetts, and witnessed a more elaborate demonstration of the project, which Judge Duffy summarized as follows:

"First a Perma employee drove a car equipped with the anti-skid device on a test track behind the Perma offices. Then the representatives of Singer were given a demonstration ride in a car equipped with a Perma anti-skid device over country roads. A number of stops were made under panic conditions. Some of these were made while the car was driven with two wheels on dry road and the other two on the wet, snow-covered shoulder." (Op. 10; see Tr. 303-05, 2131-32, 6003-06).

At the meeting following the demonstration, copies of a "glowing report" in tabloid newspaper form concerning

5. Singer discusses these representations as though it were the June contract that is the subject of this suit. However, there was a complete novation between the parties when they entered the December contract (PX 60A, §7 at 12; S. Br. 8).

6. Those present also included E. Sprague, chief engineer of Singer's Elizabeth, New Jersey, factory, and C. Morris, assistant general manager of the factory before and general manager after May (Tr. 287-88, 5925-26, 5934, 6002).

results of prior tests of the Perma device were furnished (Op. 8; PX 19; Tr. 5937, 6008-09),⁷ as was a Singer brochure which was "boastful about the engineering and quality control expertise of Singer" (Op. 10; PX 13A at 25-26; Tr. 290-91, 2138). Immediately thereafter in February, 1964, Perma furnished Singer with "a set of plans and specifications, three anti-skid controls and a cutaway [model] of the device" and Singer management commissioned a study of the patents (Op. 10; PX 17, 22; Tr. 310-11, 5945). Before the June contract, although Perma concededly engaged in a certain amount of "puffing" as to the nature and characteristics of the device (Op. 9), Perino candidly disclosed to Singer a number of problems that Perma was then encountering in the course of the conversion of the product from prototype to mass produced hardware by Worcester Stamped Metal Co. (Tr. 41-54),⁸ and Singer's engineers became aware of the inadequacy, incompleteness and contradictory nature of the manufacturing and testing specifications supplied by Perma (Tr. 4181-82, 4185, 4194, 5334-38).

Representatives of Perma and Singer met several additional times between February and June, 1964, including an all-day meeting at Singer's Elizabeth plant attended by at least five Singer engineers at which Perma representatives

"... displayed to the top Singer officials the entire device with all of its components spread out on con-

7. The report was prepared by Andrew White, owner of a research and testing organization named Motor Vehicle Research of New Hampshire ("M.V.R.N.H.") (Op. 7, Tr. 140). Although Singer points to facts reflecting White's lack of independence from Perma and claims it was ignorant thereof until after this suit was commenced (S. Br. 6), a management consultant's report commissioned by Singer before it entered the December contract advised Singer that the tests conducted by Mr. White's organization were "sponsored by Perma" and questioned their accuracy (PX 57 at 7, 17).

8. These problems included brake fluid leaking from the check valve part of the Perma-Vac piston; gear box and pressure switch failures; brake fluid leakage because of the cutting of rubber "O" ring seals in the mass production; breaking off of the inlet pipe to the Perma-Vac due to faulty mass production techniques; and loss of brakes because of premature wear of the governor housing which had impaired the function of the solenoid (Tr. 341-54).

ference tables. The promotional film was shown and the M.V.R.N.H. report was distributed."

(Op. 11; Tr. 4143, 5355-57, 6028-30, 6038-39). It was the sound portion of this promotional film which stated, among other things, that the invention "includes a fail-safe feature which will automatically revert to the standard braking system in case of failure" (DX 1 at 8; S. Br. 6). As Singer's own expert testified at trial, it was "apparent fairly readily" from an examination of the hardware there on display that the fail-safe features the device possessed did not make it absolutely fail-safe, the criterion later advocated by Singer and discussed below at pp. 28-30 and 53-59 (Tr. 7290-91). In fact the device was fail-safe in the event of those failures most likely to occur and was thought by Perrino to be acceptably fail-safe (Tr. 274-79, 870-71, 1332-33).⁹

The June Contract

The Court below summarized the June contract as follows:

"On June 18, 1964, the parties entered into a Patent Licensing Agreement by which Perma granted Singer the exclusive right to manufacture the device in the United States. In order to oust the Worcester Stamped

9. It did however require an additional fail-safe feature to satisfy then applicable automotive industry standards. All that was needed to accomplish this was the addition of a simple time-delay switch or valve to the modulator component. These subjects are discussed in detail below at pp. 28-30 and 53-59. Reference is here required because Singer, throughout its brief, grossly distorts the issue of fail-safety both by misstating its own understanding prior to December 21, 1964 of the fail-safe features in the Perma device and by exaggerating the degree of difficulty involved in making the device conform to automotive industry standards (S. Br. 6, 7, 9, 13, 14). Indeed, nowhere does Singer ever acknowledge the overwhelming evidence that its engineers knew before December 21 (and indeed before the June contract) that the device was not absolutely fail-safe (discussed below at pp. 14-16). In addition, Singer repeatedly and erroneously suggests that many months of experimental engineering efforts would have been necessary to make the device acceptably fail-safe by automotive industry standards (*see, e.g.* S. Br. 14-15), whereas in fact the opposite was proven at trial (*see* discussion below at pp. 21-23).

Metal Company, Singer agreed to buy the inventory then being held by Worcester."

(Op. 12; PX 35).¹⁰ Singer's obligations under this contract were not limited to manufacturing "in accordance with specifications and blueprints furnished by Perma" as Singer states (S. Br. 7). Singer expressly undertook to assist Perma in the conversion to mass production by agreeing to maintain "joint continuing engineering supervision and development of the product" and the exchange of "technical knowledge applicable to the design and manufacture of the product" (PX 35, §9 at 5). The contract also contemplated design changes in the product, although Singer's right to make any such changes was conditioned on prior approval by two officers of Perma (PX 35, §9 at 6).

What Singer Learned from June to December, 1964

The portion of Singer's Statement of Facts dealing with events during the period from June to December, 1964, focuses on specific things Singer did not do, and claims it did not know. The following is a summary of what Singer did between June and December, 1964, and the knowledge of the device and its imperfections acquired in the course of that experience.

The District Court summarized the events of this period as follows:

"It is undisputed that, after the Elizabeth plant acquired the inventory and started production, many defects were found in the mass-produced device. During this period from mid June to December 1964, officials from Perma visited the Elizabeth plant quite often and the parties redesigned a number of the components of the device, including many of the so-called 'fail-safe features'." (Op. 12)

10. Perma had contracted with Worcester Stamped Metal in late 1963 to manufacture the device; the closing of Worcester's plant by a strike in November, 1963, made Perma particularly receptive to Singer's initial approach seeking rights to the device (Tr. 177, 289, 284-87; PX 14, 15).

Specific Problems Encountered

The problems which surfaced in the process of converting from prototype to mass production and of which Albert Romel, Singer's chief engineer on the project was aware (Op. 13; Tr. 5320) included:

erratic performance of the pressure switch which Romel attempted to redesign (Op. 13; Tr. 4333, 4908-11, 5450-51, 5455-57;

"hanging up" of the cam gears, on which Romel decided to defer what he considered as necessary redesign work (Op. 13; Tr. 4337-41; PX 49 at 2);

contamination of the sensing unit (Op. 14; PX 53; Tr. 5503-05, 5508) and "binding" of the rotary valve (Op. 14; Tr. 5490-91) on which Romel was working in December 1964 (Tr. 5511-14);

the need to strengthen the spring used in the Perma-Vac to assure proper functioning with newer model cars (Op. 14; Tr. 4419-20; PX 57 at 6), a problem for which Romel sought a solution immediately after December 21, 1964 (PX 65A at 2);

premature wearing out of the gear box, which Romel undertook to redesign (PX 39 at 2-3; Tr. 4290, 5424-25; DX 102, 111, 114, 115, 118);

fluid leakage from the pressure switch and from the check valve of the Perma-Vac (PX 24 at 3, 38A at 2, 39; Tr. 5446, 6176-77; PX 54; Tr. 421).

Romel perceived the significance of the obstacles these problems posed to prompt shipment of reliably-functioning product¹¹ and took care before the December contract to

11. These problems encountered with mass-produced hardware, although serious, were not difficult to solve. Indeed even Romel with his limited engineering skills succeeded in solving all of them within a few months after the December contract, except the problem relating to the need for increased pressure output from the Perma-Vac (*see* discussion below at pp. 24-25). That he failed to solve only because he rejected Perrino's suggestion for a strengthened spring in favor of his own ill-conceived transfer valve (Op. 23-24; *see* discussion below at pp. 26-27).

inform his superiors of the difficulties he faced (PX 38A, 39, PX 53).¹² He recommended performance testing specifically directed to "all the possible causes for failure" (Op. 14; PX 39 at 3) and, despite Singer's representation in its brief that it had "no occasion to do performance testing . . . or to analyze the failure modes or the fail-safety of the device" (S. Br. 7), the permission sought by Romel was promptly given by the Elizabeth plant's assistant general manager (PX 47 at 1).¹³ Singer in fact conducted numerous performance tests of the device on test stands both before and after its numerous modifications between June and December, 1964 (Op. 15, *e.g.* Tr. 5548-49 (pressure switch); PX 39 at 2; Tr. 5424-27, 5432-33; DX 111, 114, 115, 118 (gear box); Tr. 5512-14, 5537 (sensing unit)). Singer also conducted tests of a device installed in a Singer vehicle in November, 1964 (Tr. 5379-87; PX 147). Singer's statement that its "testing of the device during the period of the June contract related only to proper manufacture" (S. Br. 7) is thus at best inaccurate.

Singer had another important source of knowledge of the imperfections in the Perma device prior to December:

12. In addition to these memoranda, Romel reported on these and other problems at a meeting in December, 1964 held one to two weeks before the December contract was executed and attended by Messrs. Hough and Murphy of Singer's New York executive office and Broeker, Kloby, Sprague, Wagner and Sharp of Elizabeth (Tr. 4484, 4491, 4498-4501, 4502-03). Messrs. Hough, Murphy and Sprague were graduate engineers. Hough, holder of a Masters Degree in Mechanical Engineering from MIT, had previously kept himself "fully informed" of the problems encountered by Singer (Tr. 6881, 6890, 6892, 6090-92) and knew, through Kloby, that Singer in November was having problems with components of the device. Murphy, holder of a Masters Degree in Industrial Engineering, had visited the Elizabeth plant bi-weekly through the fall and reviewed the status of the project. He even participated in "shirt-sleeve" inspections of components and was aware of problems with pressure switches and gear boxes (Tr. 5831, 5851, 5853-54).

13. Indeed the Assistant General Manager requested from Romel "a plan of action . . . to solve the problems inherent in this unit . . . and . . . [a program of] reliability tests on complete units to ascertain whether any new problems could be discovered which would cause malfunctions in the field." (*Ibid.*)

an independent study of the device by the management consulting firm of William E. Hill & Co., which Singer commissioned in mid-October 1964 (Tr. 6075-76). The Hill firm reported orally to Singer on November 11, 1964 and delivered its findings on December 14 (PX 57 at 1; Tr. 5980).¹⁴

The tenor of the Hill report, reproduced as Appendix B to the District Court's opinion, was precisely the opposite of the characterization now being adopted by Singer (S. Br. 8). It explicitly advised that, on the basis of the hardware tested by various of the major automobile manufacturers the device was not yet of proven reliability (PX 57 at 10). It also warned that, because of increased stopping distances experienced in certain tests on some road conditions, some, although not all, automotive companies were against use of the device (PX 57 at 7-8),¹⁵ and that, in its present state, "the Perma anti-skid control falls short of meeting requirements of automotive engineers . . ." (*id.* at 3).

Fail-safe Characteristics of Perma Device

By reference to the Hill report which did not "mention fail-safety" and a post-December-1964 report expressing the need for a "fail-safe feature," Singer misleadingly seeks to imply that on the basis of pre-June promotional statements by Perma, it entered the December contract relying on the idea that the Perma device was absolutely fail-safe (S. Br. 6, 8-9). When this claim was expressly made at trial as a defense to Perma's claim of breach of

14. The report was read by Kloby, Director of Forward Planning and later manager of the Perma Project (Tr. 5996-97, 6158-60). It was then also read by Broeker, assistant general manager of the Elizabeth plant, and Patten, factory sales manager, who met and discussed it page by page (Tr. 6205-09), as well as Murphy, the executive responsible for the Elizabeth plant (6205-07). Hough, the vice president who later signed the December contract on behalf of Singer, testified that he "saw" it but did not "read" it (Tr. 6907).

15. American Motors and Cadillac Division were said to be "in favor of the system," while General Motors Research Center, Ford and Chrysler were said to be against its use (PX 57 at 8).

contract, it was found "to be totally sham as a matter of fact" (Op. 38). On this appeal Singer does not claim any error in this finding or in the District Court's underlying finding that Perma made "no misrepresentation" about fail-safety or its alternative finding that in no event was there reliance by Singer (Op. 38). Instead, Singer resorts to half-expressed implications of misrepresentation in the hope that it will color the atmosphere on this appeal.

Significantly omitted from Singer's description of the events between June and December were the following facts which informed Singer about the fail-safe characteristics of the Perma device:

Kloby, the man who became manager of Singer's Perma program, admitted knowing before December 21, 1964 that Perma device was not fail-safe by Singer's absolute standard (Tr. 6249-50).

Both Morris, the assistant general manager of Singer's Elizabeth, N.J. plant, and Kloby knew of at least one incident of a loss of brakes on a car equipped with the Perma device (Tr. 349-52, 6173).

Romel was aware of a defect in some mass produced hardware which was "very serious and could cause a brake failure" (PX 38A at 2; Tr. 5463-64).

Romel himself observed malfunctioning of the cam-gear—the heart of the Perma fail-safe—and recommended a design change which he had not implemented by December 21 (Tr. 5530-32, 5372-73).

Finally, Singer's trial expert, MacDuff, testified that it was apparent "fairly readily" from an inspection of the device and would have been to any engineer that the Perma device was not absolutely fail-safe (Tr. 7290-91).

In short, there could be no question on this appeal, even if it were asserted directly, that Singer knew before December 21, 1964 that the device covered by the patents it was acquiring was not fail-safe by the definition it later used when it sought to justify its abandonment thereof (Op. 37).

Singer's Failure to Ship Product

As a result of the problems encountered with the hardware being mass-produced, Singer was unable to ship more than a negligible quantity of anti-skid devices to distributors in the fall of 1964 (Op. 15; Tr. 406-07, 409-10, 420-56). This, in turn, created serious cash flow problems for Perma and pushed it to the verge of bankruptcy (Op. 15, 39; Tr. 453-56; PX 59 at 2). Singer recognized and took advantage of this circumstance to negotiate a one-sided contract by which it took over the patents, agreed to pay royalties for only ten years and guaranteed no minimum royalty (Op. 39, 40; *compare* PX 60A, §3 at 4-6 with DX 191 at 3).

B. The December Contract

The Negotiations

Singer's Statement of Facts omits any discussion of the negotiations which led to the December contract, during which the trial court found that "Singer offered to Perma its engineering skills and purported expertise" (Op. 16). In the fall of 1964, Perrino complained to Singer's Robert Kloby¹⁶ about the lack of progress in getting the device to market, and the need for more engineers on the project including an automotive engineer (Tr. 453-58, 471-75, 457).¹⁷ Kloby told Perrino that Singer's budget under the June contract did not contemplate additional engineers but that Singer could justify more expenditures and engineers, including an automotive engineer, if Perma would agree to assign the anti-skid patents to Singer outright (Tr. 457, 471-75, 2136-37). Thereafter Kloby, who negotiated the December contract for

16. He was then Director of Forward Planning and after December 21, 1964, was placed in charge of the Perma program with the title of Manager, Perma Program (Tr. 5997, 6158-60).

17. Perrino at this meeting with Kloby specifically complained that the problems plaguing the device before June still existed, that Singer had not kept its original promise to assign the engineers necessary to solve the engineering and quality problems and that additional engineers including an automotive engineer were required (Tr. 453-58, 471-75, 287-308).

Singer, held additional conversations and meetings with Perrino during which he repeated these assurances and Perrino agreed, on behalf of Perma, to assign Perma's patent rights to Singer (Tr. 457-58, 473-75, 5892).

Uncompleted Engineering Work

In discussing the expectations of the parties at December 21, 1964, Singer's brief omits any reference to the state of the invention's hardware, relying instead on a misstatement of Perrino's testimony (S. Br. 9). Perrino testified, not that mass-produced units were "workable, usable and marketable," but that his earlier hand-made prototypes had been (Tr. 1351-53; see Tr. 304-05, 1692-94, 1697-98, 2087, 2090-2101, 6004-07; PX 21, 19). That is why he could testify that the "*design*" was ready for mass-production but that the hardware had not, as of December 21, 1964, been successfully converted from prototype to mass-produced product (Tr. 1353). When the December contract was executed, numerous component problems existed and "[b]oth parties recognized the need for further engineering on the device . . ." (Op. 15). Singer's engineer Romel apparently then believed his redesign work would solve the gear box problems, but testing of the redesign work had only recently begun and did not conclude until sometime after December 21, 1964 (DX 115, 118, 233; Tr. 4293, 4498-99). The problems of contamination entering the sensing unit and the binding of its rotary valve were not solved by December 21, 1964, although experiments with and tests of a number of potential solutions were being conducted (Op. 14; Tr. 4499-4500). Testing of these changes continued without interruption to February, 1965 (DX 234, 236, 242; Tr. 4942-55). The redesign of the cam gear which Romel had earlier concluded was necessary, had not been performed by December 21, 1964 (Op. 13; Tr. 5530-32). Romel's redesign of the pressure switch had not been adequately tested by December 21, 1964 and it was further modified in early 1965 (Tr. 5456-57, 4908-12). The need for increased braking pressure was known to exist and within two days of the signing of the December contract, Singer pursued a strengthened Perma-Vac spring as a method to obtain it (PX 65A at 2).

In addition, there remained whatever additional engineering was necessary to make the device conform to Singer's then unexpressed fail-safe standard (*supra* at pp. 14-16).¹⁸

The expectation of the parties that the device would be "quickly marketed" (Op. 18; S. Br. 8) cannot, then, be divorced from their knowledge of the engineering work remaining to be done before the product could be marketed. In light of the facts outlined above, the parties necessarily contemplated the completion of this engineering work and the performance and reliability testing that would normally follow it. Not surprisingly, therefore, when Singer entered into a contract with Monitor Enterprises Inc. in January, 1965, for the distribution of the device, it expressly excluded any liability for its failure to deliver product (PX 64, §13 at 10). Singer, in describing this contract, refers only to the fact that under it Monitor was obligated to accept delivery of up to 50,000 units in 1965 and to spend up to \$250,000 on promotion (S. Br. 9). Singer fails to disclose that it was not obligated to deliver even a single unit in that period (PX 64, §13 at 10; *see* §7 at 6), and that Monitor's promotional obligation would be reduced in proportion to Singer's failure to deliver units (PX 64, §2 at 3).

Finally, Singer misleadingly asserts that immediately after the December contract it "resumed production" (S. Br. 8). Singer's lone supporting record reference is to Romel's single statement that "[S]inger resume[d] production or *assembly* of Perma anti-skid units . . . right after the contract was signed . . . in a matter of a couple of days actually . . ." (Tr. 4517) (emphasis added). Romel was not asked whether such "assembly" was for any purpose other than testing his recent hardware modifications, but Romel's statement can only be understood in the context of his detailed testimony that, at that very time, tests of his recent hardware changes were continuing (*supra* at p. 17), and he was seeing further design suggestions from Perma.

18. Singer's attempted implication that it was first informed of a loss of brakes on a car equipped with the device when it received a field report in January, 1965 to this effect is without basis (*see* text *supra* at pp. 14-16).

The Contract Provisions

The provisions of the contracts entered into by Perma and Singer on December 21, 1964 constitute important evidence with respect to which party was intended to perform then uncompleted engineering work described in the preceding section and how long such work was expected to take.

Under the December contract Singer assumed complete engineering responsibility for the Perma anti-skid device (PX 6A, §13 at 15; Tr. 5611, 5599, 6159-60, 6195-96) and vested in itself "absolute discretion . . . [to] determine the *method* of manufacturing . . . the Product" (PX 60A, §13 at 15) (emphasis added). The December contract also postponed Singer's duty to promote sales of the device for one full year until 1966 (PX 60A, §10 at 13).¹⁹ It provided for the payment of royalties to Perma on sales of product for ten years but it did not guarantee payment of any minimum royalty (Op. 18; PX 60A, §3 at 4-6). The effectiveness of the December contract was conditioned on the parties' execution of a technical services contract (PX 60A, §5(e) at 11), pursuant to which Singer was to pay Perma \$9,800 monthly so that Perma would "at the request of Singer render technical assistance to Singer, which shall include *assisting, consulting and co-operating* with Singer:

* * *

"in the continuing design and engineering and improvement of the Product . . ."²⁰

* * *

19. Singer's careful avoidance of any obligation to deliver units in 1965 to Monitor (PX 64, §13 at 10) is consistent with its expectation of the probable time lag before actual selling activity.

20. DX 656 at 3-4. Under the Technical Services Contract, Perma was also required to "render technical assistance to Singer":

"in the adaptation of the Product for use on all makes of automobiles and trucks . . . ;

"in the preparation and designing of drawings, blueprints, design sheets, bills of material, specifications and the like from

Kloby testified that Singer assumed these responsibilities under the December contract and Perma was only to render assistance in connection therewith (Tr. 6194-96).

**C. What Actually Remained to Be
Done as of December, 1964**

The portion of Singer's Statement of Facts devoted to events between December 21, 1964, and Singer's abandonment of the contract discusses facts tending to show that the Perma anti-skid device failed to conform to Singer's absolute standard of fail-safety and attempting to justify Singer's abandonment of its contract. Although Singer refers to "its efforts to resolve the technical problems" in 1965 (S. Br. 10), it omits any description thereof for the obvious reason that they were found by the District Court to have been "abysmally inept" (Op. 29).

Singer's principal purpose in this segment of its brief (S. Br. 13-14) appears to be to convey the impression that as of December 21, 1964, the Perma device required redesign so substantial that it was impossible for the trial court to do other than guess what it would be like once it was perfected. Singer does this through a number of techniques. First, it erroneously states that the program of evaluation and testing recommended by plaintiff's expert Goor "required the redesign of the device in an unknown and unspecified configuration" in order to satisfy an "unknown standard of fail-safety" (S. Br. 14). Singer compounds its misstatement of the record when it states, without record citation, that at trial "Perma contended that its less stringent standard of fail-safety could be met through a 15-month program of redesign and redevelopment" (S. Br. 13).

which the Product and its various components can be manufactured . . . ;

* * *

"in the design and manufacture of prototypes of various new models of the Product for use on various model automobiles, trucks and other motor vehicles." DX 656 at 3-4.

Fail-Safety

Contrary to Singer's assertion (S. Br. 13), Goor's program was not necessary to make the invention acceptably fail-safe. That was a simple matter which could have been readily accomplished by a little competent engineering work. Although the Perma device already had numerous fail-safe features directed to the kinds of failure most reasonably to be anticipated (Op. 37),²¹ it was not equipped, in December, 1964, with a mechanism designed to by-pass the unit in the event the vacuum controlled diaphragm in the Perma-Vac modulator remained in the retracted (or brakes release) position longer than it should (Tr. 2476, 2556-57, 2448-49, 2480-81). Once equipped with such a mechanism, Goor testified, the Perma device would have satisfied the automotive industry's standard of fail-safety (Tr. 2448-51, 2480-81, 2483-84, 2320-21).²² Ford, General Motors and Chrysler each made their respective systems fail-safe by installation of simple time-delay switches or valves in the modulator components of their respective systems (PX 163 at 13; Tr. 2480-81, 2483-84; Tr. 7032-33; PX 156 at 5-60 (travel switch); Tr. 7035-37; DX 655 at 6 (fail-safe switch); Tr. 7094-97). Such a switch could readily and inexpensively have been installed on the Perma-Vac modulator (Tr. 2476, 2480-81, 2483-84), and prevailing automotive industry standards of fail-safety would accordingly have been satisfied (Tr. 2480-81, 2483-84). Goor testified that it "would be a very simple thing

21. In the event of failure of the drive train or an electric failure, the device would be by-passed and normal braking restored (Tr. 2954-55). Perrino believed those features justified his claim that the device was fail-safe (Tr. 274-79, 870-71, 1332-33).

22. Singer, on the other hand, urged on the District Court and urges on this Court an absolute standard of fail-safety unique to itself: a device is not fail-safe if there is any conceivable circumstance, no matter how remote, under which a failure in the device could lead to a loss of brakes (PX 104; S. Br. 29-31). Singer's definition was rejected by the automotive industry and by its own expert witness who acknowledged it to be virtually impossible to meet (Tr. 2583-85; 7111-12; see discussion *infra* at pp. 55-57).

to accomplish" (Tr. 2484) and that it could have been done, as it had been at Kelsey-Hayes, by adding a time delay switch to the Perma-Vac (Tr. 2480-81).

Indeed, Perrino submitted a design for one such switch to Singer in the fall of 1965, which Romel failed to analyze (Tr. 5168, 5784-85), but which Goor testified "could have easily been installed to perform the . . . function of bypassing the unit" (Tr. 2481).²³

In short, the record is clear that in December, 1964, it would have been neither difficult nor time-consuming to achieve a level of fail-safety in accordance with applicable automotive industry standards.

Goor's Program

Goor's proposal represented one expert's opinion rendered at trial in 1973 of an appropriate program for Singer to have followed after December 21, 1964 in evaluating, testing and perfecting the Perma device. It would have cost approximately \$650,000²⁴ or some \$50,000 more

23. Goor was a consultant to Kelsey-Hayes from 1967 to 1971 (Tr. 2296). While serving as director of engineering and research, he had overall responsibility for the company's anti-skid program for several months starting in late 1967 (Tr. 2299-2302). Thereafter he continued to serve as a consultant to Kelsey-Hayes' anti-skid program (Tr. 2359-61). Goor did not testify, as Singer claims (S. Br. 14), that "additional computer work was necessary" in connection with making the Perma device fail-safe. His testimony at the pages cited by Singer (Tr. 2530-31) dealt with the use of a computer to facilitate analysis of failure modes. Even Singer performed a failure mode analysis of the Perma device, albeit not until August, 1965 (Tr. 5044-45).

24. On the assumption that no prototypes were available, Goor's 1973 estimate of the cost of his program was approximately \$750,000 (Tr. 2543-45). However, on the reasonable assumption that prototypes could have been built from Singer's extensive inventory, the estimated cost would have been reduced by approximately \$100,000. The following costs would have been eliminated in whole or in part: \$60,000 cost of prototypes (Tr. 2531-32), part of cost of fleet buildup \$40,000 (Tr. 2538-40) and two to three months' worth of upgrading costs or \$20,000-30,000 (Tr. 2541-43). Based on the same assumption, Goor's program would have required only 12 months, not the 15 months claimed by Singer (S. Br. 13, 14).

than what Singer actually spent in 1965²⁵ (Tr. 2513-14). It would have required approximately twelve months before production began (Tr. 2542)—the very period contemplated by the December contract since Singer was not obligated thereunder to promote sales of the product for one year (PX 60A, §10 at 13), and required twenty employees—only five more than Singer actually utilized.²⁶

While the scope and cost of Goor's proposal was not very different from that which Singer, however ineptly, undertook, its content was significantly different. Goor's approach involved a systematic analytical and testing program carried out by skilled engineers and technicians (Tr. 2511-47), while Singer's involved incompetent people who prepared no program and contented themselves with making ill-conceived, unnecessary and complex design changes whose consequences they neither understood nor adequately tested. Goor recommended four overlapping steps

25. Singer actually spent more than \$600,000 in 1965. Some of Singer's expenditures were \$190,000 on "engineering costs" (Op. 22; PX 89 at 2; DX 686 at 2), \$211,000 in expenses resulting from Singer's abortive and premature attempt to market the device after a few "quick-fix" improvements (DX 595, 686; PX 110 at 5) and \$180,000 on inventory, overhead, and contract cancellations (DX 595, 618, 686). Singer's internal estimate before December 21, 1964 in a memorandum from vice president Hough to Singer's president Kircher of only some of the anti-skid related expenses to be incurred in 1965 was as follows:

Reworking gear box and sensing unit	\$131,000
Start-up costs	50,000
"Technical services"	125,000
	<hr/>
	\$306,000 (PX 59 at 7)

In a pro-forma income statement for the years 1965-67, Singer included additional anticipated Technical Services expenses of \$250,000. This then represents total costs estimated by Singer before December 21, 1964 of \$556,000 which Singer, for its own reasons, chose to allocate to three years (PX 59 at 7).

26. Singer proved at trial that it had assigned three engineers, nine technicians and a program manager to the project and utilized from time to time the services of two other engineers (DX 687; Tr. 4834-35, 4837-39; 4930-31). Goor's plan called for four engineers with systems or automotive experience, three computer programmer technicians, seven draftsmen, two mechanics, two drivers, a machinist and a buyer (*see* S. Br. at 14n; Tr. 2520-21, 2527-28, 2533-34, 2539).

to prepare the product for manufacture: (1) evaluation of existing staff and assignment of qualified replacements where necessary, followed by a comprehensive engineering and mathematical analysis of the device including such engineering modification as might be necessary to upgrade performance (Tr. 2515, 2520-23, 2525-26); (2) prototype assembly and testing combined with a complete failure mode analysis (Tr. 2527-28, 2530-32); (3) reliability testing of units incorporating such modifications as might be necessary to facilitate mass-production (Tr. 2532-36); and (4) road testing (Tr. 2537-39).

"Redesign" of Device Not Required

Aside from the addition of a fail-safe device, the only other significant work which remained to be done after December, 1964, was (1) the modification of the Perma-Vac to accommodate the need for increased pressure output and fluid displacement required by 1965 model cars (PX 57 at 6, 65 A at 2; Tr. 4419, 597-98), (2) testing of Singer's late 1964 and early 1965 hardware modifications to the sensing unit, pressure switch and gear box to determine their effectiveness and reliability or the making of comparable additional such changes, if prior modification proved ineffective when tested (PX 53; Tr. 5503-05, 5508, 5490-91, 5511-15; Op. 13; Tr. 4333, 4908-11, 5450-51, 5455-56; DX 114-15, 118; Tr. 4290, 5424-25, 2532-36), and (3) extensive bench and road testing of the device for reliability (Tr. 2532-39).

These efforts certainly would not have required "re-design of the device in an unknown and unspecified configuration" as Singer claims (S. Br. 14). Thus, the changes in the Perma-Vac could have been accomplished simply by increasing the size of the main spring and the piston bore or by simply enlarging the Perma-Vac.²⁷ In any case no change in the modulator's basic configuration was required. The changes to the sensing unit were typical of those called for. Romel himself solved the problem of contamination entering the unit from the drive train by the

27. Such modifications were not "unknown or unspecified." They were the subject of specific proposals. See, e.g., DX 417 at 4 (spring) and PX 98B (bore); see also Tr. 597-98.

addition of a steel washer (DX 577 at 20; Tr. 4953-55) and the problem of binding of the rotary valve by changing the filtering material used in an air filter (DX 313, DX 577 at 21). The problems with the pressure switch were apparently solved with the help of a Singer research engineer by the insertion of a small "guide sleeve" (Tr. 4923-24) and the substitution of one rubber "O" ring washer for another (Tr. 4885-87, 5457; DX 577 at 8). Apparently no further change in the gear box was required since tests in 1965 proved the adequacy of changes made in December, 1964 (Tr. 4290-91, 4293; DX 118).

If the Perma-Vac had been correctly modified, only reliability testing, and such changes as testing revealed the need for, would have remained before the Perma device would have been ready for market.

The Defect in Singer's Efforts

Romel was apparently able to make such changes as adding washers and filtering materials and substituting one "O" ring for another. However, his principal efforts in 1965, which dangerously downgraded the invention, reflected his total lack of the necessary qualifications to serve as chief engineer on Singer's Perma Program. He had just graduated from Newark College of Engineering a few months before being placed in charge of engineering for this project, after attending night sessions for eight years and failing his professional licensing examination (Tr. 4098-99, 5310-12, 5320; DX 687 at 1). He had no automotive or braking system experience and even lacked the skill to perform basic mathematical calculations accurately (Op. 20-21; Tr. 5317-18, 5689-95, 6519).²⁸ Romel's staff consisted of a number of persons who, although assigned grandiose engineering titles by Singer, were only high school graduates (*compare* DX 686 with 687; Tr. 6857-60), and three graduates of Newark College of Engineering (DX 687). None of these was an automotive or braking engineer and

28. Nor could Romel receive engineering guidance from his immediate superior, Robert Kloby, who was "in charge" of the program. Kloby, although qualified in market evaluation and sales forecasting (Tr. 5994-98), was not an engineer (Tr. 5994, 6102).

no one with such qualifications was ever assigned to the project (Tr. 5617). Although Singer had 15 separate research and development laboratories with highly qualified engineers, the project was not assigned to any one of them (Op. 40; PX 144 at 22; Tr. 5611).

Although Romel testified that he did not fully understand the invention when he assumed full engineering responsibility therefor, he never ordered a comprehensive analysis of its design and function of the kind recommended by Goor (Op. 21; Tr. 5551, 4616-13a, 5586-88, 5589-90).

He also failed to undertake a complete failure mode analysis, as recommended by Goor, until August, 1965 (Tr. 5045)—eight months after assuming full engineering responsibility for the product (Tr. 5586-88, 5589-90).²⁹

Singer's failure to assign a qualified engineer to lead its program, caused it to make fundamental and destructive changes in the invention's hardware configurations where simple dimensional changes would readily have solved the principal problem which occupied Singer during 1965 (Op. 23-24). Thus, early in 1965 Romel committed the fundamental error of adding a complex transfer valve to the Perma-Vac to generate the increased pressure and displacement required by 1965 model cars (PX 77, PX 98B; Tr. 597-98, 602-04. His reason for doing so was that the simple and obvious changes in dimensions recommended by Perrino would have caused Singer to scrap a small portion of the inventory it had acquired when it ousted Worcester Stamped Metal (Op. 23-24; Tr. 597-99, 6263-64; PX 89 at 2; DX 603; *see infra*, p. 42 n. 46). Romel's transfer valve introduced vacuum to the front of the Perma-Vac diaphragm to assist in pumping the brakes, thus mak-

29. Significantly, when undertaken, this analysis was not in an effort to perfect the device. It was to support the recently made management decision to abandon the project (Op. 27-28; *see discussion below in text at pp. 28-30*). The earlier analysis performed in March, 1965, after Singer received the DuPont report was not, as it now claims, "an analysis of how the device could fail" (S. Br. at 9). Then Romel limited his inquiry to the points suggested by DuPont (Tr. 4616-18a, 5586-88).

ing the invention vacuum dependent for the first time (Tr. 5685, 605-07). Not only did Romel thereby introduce new failure modes, he insured that in the event of an engine stall there would be a loss of braking power (Op. 24; Tr. 605-07). Moreover, Romel's transfer valve had the important side effect of increasing stopping distances (Tr. 4771-72, 4777-78, 5714; DX 577 at 7) and his attempted solution to this problem is typical of his entire approach to readying the Perma device for mass production. He added a "restrictor valve" to the invention (Tr. 4789-90, 4792, 4819, 5725-26) without testing it on wet or slippery roads (Tr. 4799-4800, 5725). The effect of a "restrictor valve", which permits hydraulic fluid to move more freely in one direction than in the other is to prevent the rapid release of brake fluid (Tr. 4789-90), thus preventing the anti-skid device from functioning on the very road surfaces on which effective operation was most needed (DX 323 at 2, 336 at 1; Tr. 5729).³⁰ Singer's misguided efforts with the transfer and restrictor valves coupled with incompetent efforts to overcome the side effects thereof constituted the bulk of Singer's engineering efforts from March to late 1965 (Tr. 5676, 4771-72; PX 77, 79; Tr. 4792-96, 5727-29; DX 670; Tr. 5089-90, 5695-5702, 5705, 5799-5805).

In short, it was only the incompetence of those assigned to the project by Singer which made the task of readying the Perma device for manufacture seem long and complicated.

30. Romel chose a restrictor valve because it "appeared to be the least costly" solution with "the shortest lead time" (DX 577 at 9; Tr. 5716-18). Other examples of Singer's inept engineering efforts included Romel's attempt to overcome the vacuum dependence created by the transfer valve by enlarging the Perma-Vac diaphragm and container without enlarging the inlet openings in the same proportion, thus dooming his experiment as a matter of engineering principle (Tr. 5695-5702, 5705) and his rejection of a fail-safe by-pass valve on the ground that its operation involved an unspecified but minuscule delay which was subjectively unacceptable to him (Tr. 5799-5805, 5207-08) even though the fail-safe valves or switches installed in the Ford, Chrysler and General Motors anti-skid devices all involved substantially longer time delays (Tr. 7032-33, 7035-37, 7094-97).

***Singer's True Reason for Abandoning
the Perma Project***

In July, 1965, Romel and his staff, believing they had a product ready for market (PX 82),³¹ were conducting road tests (Tr. 4848) when there was a management shake-up at Singer's corporate headquarters (DX 479; Tr. 3586-87). As a result Alfred DiScipio, the new vice president in charge of consumer products, became responsible for the Perma project (Tr. 3587-88). DiScipio attended a demonstration conducted by Romel of a vehicle equipped with an anti-skid device which incorporated Romel's transfer valve (Tr. 4848-49). The car skidded dangerously out of control (Tr. 3602-03). Without ascertaining the cause of the skid (Op. 26; Tr. 3603, 3606, 3974)³² DiScipio announced to the Singer staff that he would not permit Singer to market it unless it satisfied an impossible standard of fail-safety. He stated that Singer would not market a product that "under *any* circumstance could leave the purchaser . . . less safe than if he hadn't elected to purchase it. . . ." (Tr. 3609-10). DiScipio's absolute standard was not the standard of fail-safety then prevailing in the automotive industry (*supra* at pp. 21-22; Tr. 2480-81, 2483-84). It was "totally rebuffed" by Singer's own expert witness at trial (Op. 36; Tr. 7111)³³ and it had to be since, by its terms, it required that the fail-safe features themselves be 100% failure proof.

Since absolute fail-safety is unattainable in the real world (Op. 36; Tr. 7111-12), it shortly became apparent that

31. In this document, dated July 7, 1965, Singer's Manager of Factory Sales, after reviewing Singer's modifications to the device, stated "We feel we have a product worthy of offering to the public and plan a full marketing campaign for September with limited production and sale starting within the next 3 to 4 weeks" (PX 82).

32. Interestingly, Person, DiScipio's assistant, testified that the failure at the demonstration was attributable to Romel's transfer valve (Tr. 3378, 3381).

33. DiScipio, although without experience in the automotive industry and ignorant of its standards, made no attempt to ascertain those standards before imposing his own (Tr. 3586, 3153).

Singer's true reason for adopting this standard was to have an excuse to abandon the Perma project after DiScipio and his staff decided the automotive parts business was unattractive to Singer (Op. 27).³⁴ Singer's decision to abandon the project was formally made on November 9, 1965 (PX 99, 100; Tr. 3529-30). Events in the interim, however, indicated that this decision had already been made in July, and that what followed was window-dressing to protect Singer's legal position (Op. 27, 28, 32).

Singer first told Perma's representatives on August 30, 1965, that it would not market the device unless its standard of absolute fail-safety was satisfied (Tr. 723-28). Singer next wrote a self-serving letter to Perma on September 9, 1965 (with a copy to Singer's counsel) asserting claims against Perma and falsely stating that, in an effort to determine if the device could be modified to make it marketable, Singer would obtain independent evaluation of the device by Cornell Aeronautical Laboratory (PX 92). Significantly, by this date, Singer had already decided not to pursue the Cornell proposal (Tr. 3215, 3415; DX 502). At the same time, Singer rejected Perma's offer to work jointly with Singer in an effort to add one or more fail-safe features (Tr. 729; PX 92 at 2). When Perrino, unaware that DiScipio had already approved Singer's abandonment of the Perma program (Tr. 812-14), pressed for the reasons his recent fail-safe proposals had evoked no response, Person, Vice President DiScipio's immediate assistant at Singer, candidly explained to Perrino, "Very bluntly, Frank, we do not want to be in the brake business. . . ." (Tr. 814).

34. Singer's management expressed this most pointedly in PX 99 dated November 9, 1965, as follows:

"[T]he product [the anti-skid device] is in a business which is not basically attractive for Singer" (PX 99 at 6)

The reason stated was,

"it is doubtful whether a controlling position could be attained because of the purchasing power and engineering skills of the Big Three [G.M., Ford and Chrysler]." (PX 99 at 8)

The same reason was set forth in two earlier memoranda written by Singer management in August 1965 (PX 88A at 2; PX 90A at 4).

That decision having been made, Person invited Perma to a meeting if it could satisfy the following definition of fail-safe:

"We do not regard a device as fail-safe unless failure of the device, regardless of cause or probable frequency of a particular type of failure, does not impair the utility of the underlying system to which it is connected."

(PX 104; Tr. 3153). Recognizing the futility of such an effort in light of Person's frank admission of Singer's real objective, Perrino did not respond (PX 104; Tr. 822, 3303).

D. Perma's Damages

Meanwhile, although others were in the brake business, the first electronic anti-skid device did not appear until the 1969 model year. In the interim, Singer sat idly on the Perma patents, neither returning them,³⁵ nor licensing them, nor taking any steps to exploit the market in which Singer, for at least those three years, would have been the only competitor. Although Singer now cites low sales figures for anti-skid devices manufactured by certain original equipment manufacturers ("OEM"), apparently to minimize the scope of the market that existed at the time, there is nothing in the record to indicate that the OEM ever made any effort to promote their anti-skid devices; indeed, the only evidence on the subject compels precisely the oppo-

35. In the ten years since its breach of contract, Singer has failed to mitigate damages and, as a result, even today retains the patents to the Perma anti-skid device. Singer did offer to return the patents to Perma. The terms of that offer, however—a \$2,000,000 payment by Perma and a general release (Tr. 3367-68)—do not permit the inference that it was seriously intended. Since Perma's near-bankruptcy had occasioned Singer's acquisition of the patents in the first place, *see* pp. 16-17, *supra*, the \$2,000,000 price could not have been fixed with a view to acceptance. What it does indicate, however, is that the device which Singer's expert described as "unmarketable" in 1974 (Tr. 6991) was not so considered by Singer in 1966, especially since payment was to have been made on the installment basis, out of future revenues from sale of the product (Tr. 3367).

site inference, *see* DX 700 at 124.³⁶ Specific evidence in the record relating to damages is discussed in greater detail in connection with the legal arguments to which it relates, Point III, *infra*.

ARGUMENT

I

The Trial Court's Finding that the Parties Intended that Singer Use Its Best Efforts to Perfect the Device Was Supported by Substantial Evidence.

The findings of a District Court, sitting without a jury, may not be set aside unless "clearly erroneous," *FED. R. Civ. P.* 52(a); *Zenith Radio Corp. v. Hazeltine Research, Inc.*, 395 U.S. 100, 123 (1969). In applying this test, this Court has consistently held that a finding is not "clearly erroneous" where it is supported by "substantial evidence," *e.g.*, *Kennedy Park Homes Ass'n. v. City of Lackawanna*, 436 F.2d 108, 112 (2d Cir. 1970), *cert denied*, 401 U.S. 1010 (1971); *Allstate Ins. Co. v. Aetna Casualty & Surety Co.*, 326 F.2d 871, 874 (2d Cir. 1964); *Heyman v. A.R. Winarick, Inc.*, 325 F.2d 584, 589 (2d Cir. 1963); *cf. Roman Products Corp. v. DiCrasto Dairy & Food Products, Inc.*, 361 F.2d 599, 601 (2d Cir. 1966) ("credible factual basis in the record as a whole").

On the question whether the parties intended that Singer use its best efforts to perfect the Perma anti-skid

36. Ford's "Sure-Track" anti-skid device is described in a short paragraph near the end of its 132-page promotional booklet "Car Buying Made Easier" as "a system of sensors, valves, actuator, and an electronic control module" which "consists of 160 solid-state components mounted on a printed circuit board inside a plastic container and filled with a rubber-like padding compound." The components are described as "includ[ing] transistors, diodes, capacitors and resistors," all of which are reassuringly "[l]ocated near the glove box of the vehicle." The only thing the prospective purchaser was told about what this bewildering agglomeration of space-age technology was intended to do was that its purpose was "to inhibit brake lock-up on wet surfaces, thereby helping to prevent skidding and loss of control," and that, to this end, it "pumps the brakes far more rapidly than a driver could; it releases the brakes just before lock-up would occur and then re-applies them." The "Sure Track" was not standard equipment on Ford vehicles, *see id.* at 123.

device, the trial court received all material evidence relating to the December contract, the negotiations between the parties and the surrounding circumstances and excluded only certain subjective opinion testimony whose exclusion is discussed below at pp. 51-52. Its finding that the parties intended that Singer perfect the device is amply supported by this evidence, some of which involved the testimony of individuals whose credibility the trial court alone had the opportunity to judge.

Singer argues at the outset that the question of intent should never have been tried, claiming that it was entitled to summary judgment on the ground that as a matter of law it had no obligation to perfect the device (S. Br. 15-18). Although Perma believes that Judge MacMahon was correct in denying Singer's motion for summary judgment because, as he held, Singer did have an obligation to use its best efforts to bring the product to market, we defer consideration of this point to pp. 48-50 *infra*, because any possible error in Judge MacMahon's ruling was mooted by the subsequent full trial of the very same issues, as explained below.

A. Evidence of the Parties' Contemporaneous Words and Conduct Overwhelmingly Established a Mutual Intent that Singer Solve the Problems Which Remained Before the Device Was Ready to Be Marketed.

Despite Judge MacMahon's ruling that the contract obligated Singer to use its best efforts to perfect the device so as to be able to manufacture and market the product (308 F. Supp. at 748-49) and despite a pretrial order that did not contemplate reopening the issue whether the parties intended that the contract impose that duty on Singer (R. 102), Singer continued to assert the absence of such intent as a complete defense and the issue was fully tried. The District Court, so that "this trial might mark an end to this litigation," permitted "extraordinary latitude to the defense to prove all that it could . . . as to its defenses . . ." (Op. 4), including all evidence relevant to the ques-

tion of the intent of the parties on entering the December contract. Accordingly, the negotiations between the parties and the circumstances leading up to and surrounding the December contract were fully explored at trial. Not only were all communications, acts and statements of the parties received in evidence, including communications between them (*e.g.*, DX 197, 409; Tr. 457-58, 473-75, 6098-99), but even communications wholly internal to Singer, in the form of conversations and memoranda showing their contemporaneous intent, were received (*e.g.*, DX 191; PX 53, 59, 120; Tr. 4498-4501, 4502-03). After weighing all of the evidence, the District Court correctly found that "the circumstances leading to the signing of the contract" made clear that "the perfection and marketing of the device was the heart of the December 21, 1964 contract" (Op. 38-39) and that, accordingly, "clearly implied in the contract is the intention that Singer would use its best efforts to perfect and market the device" (Op. 38).

1. The District Court's Specific Findings and the Substantial Evidence in Support Thereof

Singer concedes that the existence and scope of an implied obligation is a question of the intent of the parties (S. Br. 19-29), and attempts to overcome the overwhelming evidence of the parties' intent by arguing first that the trial court found an implied obligation here without considering intent (S. Br. 19) and later that the court "relied on only two facts" (*id.* at 26). Both contentions are negated by the court's opinion, which is supported by the evidence discussed below. Singer's real, but disguised, claim is that this Court should determine the issue of intent *de novo*, and reverse the trial court's findings, not because they were unsupported by "substantial evidence" but because there was some evidence in the record which can arguably be said to support a different inference. Such a determination is, of course, outside the scope of appellate review, *Zenith Radio Corp. v. Hazeltine Research, Inc.*, 395 U.S. 100, 123 (1969). The only question on this appeal is whether the trial court's findings were "clearly erroneous," and we submit that they were not.

The opinion of the court below enumerates no less than seven distinct factual bases for its findings as to the parties' intent:

"To reiterate what is said in Section V of this opinion: [1] Perma at the time it entered the contract had a negative balance sheet with a number of large outstanding debts, since [2] few of the anti-skid devices were sold between June and December 1964. The reason that there were so few sales was that imperfections had been discovered in the device. [3] Singer and Perma had been working to resolve these imperfections. [4] Singer offered its purported engineering expertise to perfect the device in return for a contract which did not even guarantee a minimum patent royalty.

[5] Singer knew that the device was still to be perfected for why else would it have entered into the Technical Services Contract with Perma? [6] The Singer personnel discovered all of the difficulties which prevented any meaningful sales of the device under the June contract. [7] They knew of the problems with the anti-skid and necessarily knew that it had to be perfected."³⁷

These findings are overwhelmingly supported by the record.

Perma's financial plight (point [1]). That Perma in the fall of 1964 had a negative cash flow, negative balance sheet and large debts it was unable to pay is not disputed on this appeal (S. Br. at 7; Tr. 456, 6080; DX 191). Indeed Perino's undisputed testimony was that before entering the December contract, Perma was on the verge of bankruptcy

37. Op. 39 (numbers in brackets supplied). There were, of course, additional factual bases for the court's findings not specifically referred to in the opinion but amply supported in the record. For example, immediately after the execution of the contract, Singer proceeded with efforts to perfect the invention's hardware (*see* pp. 17-18, 24-25, *supra*). In addition, the Hill Report, commissioned by Singer precisely for the purpose of assisting its determination whether to enter the December contract, pointed up the need for additional engineering work (*see* pp. 13-14, *supra*).

(Tr. 453-56; PX 59 at 2; DX 191). Clearly Perma was in no position to "perfect the anti-skid device for market on its own" (Op. 16).

Negligible sales of anti-skid device between June and December 1964 due to imperfections (point [2]). As a result of the numerous hardware problems encountered with the device (Op. 15; Tr. 453-56, 470-76), between June and October, 1964, Singer shipped only 500 units to distributors (S. Br. 7; DX 191 at 2) and these were promptly recalled (Tr. 1289). Despite Singer's expectation expressed in October that shipments would resume "by the end of October" (DX 191 at 2), they did not (Tr. 1289, 1290-91, 1295-96). Moreover, the only additional units shipped before December 21, 1964 were 500 replacement units which were themselves recalled shortly (DX 380).

Singer's knowledge of the problems, and of the need to perfect the device before marketing; and contemporaneous efforts to this end (points [3], [6], [7]). The problems of which Singer's chief engineer Romel became aware during Singer's experience under the June contract are summarized at pp. 12, 15, *supra*. While none of these was of sufficient complexity to deter Singer from entering into the December contract, they were clearly engineering problems, not, as Singer now argues, "manufacturing specifications."³⁸ (S. Br. 27). Nor were these problems "thought to have been resolved" by December, least of all by Singer. On the contrary, Singer's work on these problems was in progress at the very time the December contract was signed, and continued thereafter. Thus, although Romel was of the opinion that a design change in the cam gear was necessary, he had not made it as of December 21, 1964 (Op. 13; Tr. 5530-32). As of December 4, 1964, Singer did not have a solution to the problem of contamination in the sensing units and numerous proposed solutions tried thereafter had been only partly tested by December 21, 1964 (Tr. 5512-14, 5515-18, 5521-22; DX 234, 236, 242; Tr. 4942-

38. In fact, it was the *design* of the cam gear, which Romel described as "marginal" (Tr. 4339, 5535), and the design of the gear box, which he concluded "violated basic engineering principles," before he caused it to be redesigned (PX 39; Tr. 5376).

55). And two days after the December 21 contract was signed Romel sought from Perma advice on the redesign of the Perma-Vac to increase its pressure output (PX 65A at 2). Robert Kloby, who negotiated the December contract on behalf of Singer (Tr. 5892, 6097-98), admitted at trial that some of Romel's attempted solutions to the engineering problems discovered under the June contract had not been "fully tested by the December contract" (Tr. 6187-91); that there were problems with the device in addition to those described in his October memorandum to his superiors (Tr. 6170-71); and that he knew as of December 21, 1964, the device was not fail-safe by Singer's definition (Tr. 6249-50).³⁹

Messrs. Hough and Murphy, the top-level Singer executives actively involved in the decision to enter the December contract, also had sufficient knowledge of the unsolved problems to know that further engineering work by Singer would be required after December 21, 1964. Shortly prior to December 21, when Murphy was "disquieted" by the Hill Report (Tr. 5895), he and his immediate superior Hough, both of whom had Master's Degrees in engineering (Tr. 5831, 6881), were told of a number of problems which Romel had encountered. They were told that no sure solution had yet been found for one and that another had only been avoided by Romel by lowering the prior performance standard of the component (Tr. 4499-4500). That statement alone certainly told these two masters of engineering that perfecting remained to be done. Romel's statement to Hough and Murphy that he lacked access to field testing data which might reveal other problems (Tr. 4502) made it even clearer.⁴⁰

39. With respect to fail-safety, both Romel and Kloby knew that leakage from the pressure switch could lead to loss of brakes, and Kloby admitted knowing of an incident involving loss of brakes on a car equipped with an anti-skid device (PX 38A at 2; Tr. 5463-64, 6173).

40. Even assuming, *arguendo*, that the foregoing does not conclusively demonstrate actual knowledge on the part of Hough and Murphy, Singer is nonetheless bound by Romel's and Kloby's knowledge since the corporation is deemed to know what its authorized

Singer's offer of engineering expertise as an inducement to assign the patents (point [4]). There is ample evidence that Singer offered continuing and expanding engineering services as an inducement for Perma to assign its patent rights to Singer. In the fall of 1964, Kloby was already bargaining for assignment of the patents in order to justify allocating additional engineers to the project; this was his response when Perrino complained that the problems preventing successful manufacture of product had not been solved and that more engineers were needed including an automotive engineer (*supra* at pp. 16-17; Tr. 453-58, 471-75).⁴¹ At trial, Kloby admitted that, at the time the December contract was entered into, he anticipated that Singer's engineering staff, with only assistance from Perma, would be making "continuing design changes and improvements in the product" (Tr. 454-96).

The terms of the December contract and the technical services contract as evidencing an intent to perfect (point [5]). The December contract, although lacking an express statement of the nature of the obligation undertaken by Singer, contains significant evidence of an intent to perfect the anti-skid device. It provided for royalties on sales of the device, but it did not guarantee a minimum royalty

agents know, even if they fail to communicate their knowledge to their superiors. *In re Mifflin Chemical Corp.*, 123 F.2d 311, 315-316 (3d Cir. 1941), *cert. denied* 315 U.S. 815 (1942); see *Aetna Insurance Co. v. Loveland Gas & Electric Co.*, 369 F.2d 648, 651 (6th Cir. 1966); *Greenspahn v. Joseph E. Seagram & Sons*, 186 F.2d 616, 620 (2d Cir. 1951); *Universal Pictures Co. v. Harold Lloyd Corp.*, 162 F.2d 354, 371 (9th Cir. 1947); *Copeman Laboratories Co. v. General Motors Corp.*, 36 F.Supp. 755, 762 (E.D. Mich. 1941).

41. Although Kloby at trial denied having promised to assign additional engineers if Singer obtained the patents (Tr. 6098-99), the credibility of his denial was a matter peculiarly within the discretion of the trial court, *Zenith Radio Corp. v. Hazeltine Research, Inc.*, 395 U.S. 100, 122 (1969); *Langford v. Chrysler Motors Corp.*, 513 F.2d 1121, 1127 (2d Cir. 1975), and there was ample basis for disbelieving Kloby on this point. Kloby's bias was obvious: to give trial testimony favorable to Singer he repeatedly denied facts freely admitted years earlier in deposition (see, e.g., Tr. 6157-60, 6249-52). Singer had been his sole lifetime employer; he was 13 years from retirement and hoped to continue in Singer's employ despite a deteriorating medical condition which made it extremely difficult for him to work productively (Tr. 6157, 5993).

(PX 60A, §3 at 4-6). It deferred for one year Singer's obligation to spend money on advertising and promotion of the product (PX 60A, §10). Its effectiveness was conditioned on the simultaneous execution of another contract (PX 60A, §5(e)) which obligated Perma, for \$9,800 a month, to *assist* Singer "in the adaptation of the product for use on all makes of automobiles . . . , [and] in the continuing design and engineering and improvement of the product," among other things (DX 656 at 3, 4). The deferral of Singer's duty to promote sales of the product for one year, coupled with an agreement to pay \$9,800 per month to Perma for "technical assistance" in the areas described, is consistent only with an intent to perfect the product.⁴²

Singer, in an effort to mask the significance of the technical services contract to the intent of the parties, characterizes the trial court as having "inferred from this that Singer 'knew the device was still to be perfected'" (S. Br. 27 quoting Op. 39). This is simply a misinterpretation of the court's opinion, quoted above, p. 34. The court below found that "Singer personnel discovered all of the difficulties" and "knew of the problems," not by inference from the Technical Services Contract but on the basis of the overwhelming evidence of Singer's actual experience with the device *before* it bound Perma to assist in the solution of those problems.

In a further effort to distort the significance of the Technical Services Contract, Singer argues that "*Perma's* personnel resources did not begin to match the lengthy program and large, qualified staff which Goor called for" (S. Br. 27, emphasis added). Perma was not in any event required to perform the engineering services necessary to perfect the device, but, "at the request of Singer, [to] render *technical assistance* to Singer" with respect thereto

42. Singer's own attorneys so interpreted these contract provisions when such interpretation suited the theory of the case on which they were then proceeding: "Obviously it was contemplated that considerable time would be spent after the contract was entered into in attempting to perfect the device" (R. 55 at 13-14; see pp. 39-40, *infra*).

(DX 656 at 3, emphasis added). Kloby admitted at trial that Singer entered the contract relying on its own engineering efforts and would not be looking to Perma for anything but assistance (*supra* at pp. 20, 37). To the extent that Singer interprets a self-serving memorandum Kloby wrote his superiors as an indication that Singer's responsibilities would be passed off on Perma (DX 191 at 4; *see* S. Br. 27), the inference is precluded by Kloby's own words and conduct in negotiations with Perma (Tr. 453-58, 471-75). The scope of the Goor program, although exaggerated by Singer on appeal, was not only well within Singer's capabilities but reasonably close to the amount of money, number of employees and length of time Singer itself projected for bringing the Perma device to market, *see* pp. 22-23, *supra*.

This evidence was not, then, inconsistent with the trial court's interpretation of the Technical Services Contract. In an attempt to make it so, Singer argues that what the Technical Services Contract contemplated was not that engineering work would be done by Singer but that "the technical expertise of Perma would be available to Singer for improving its manufacturing methods" (S. Br. 27). How Perma, which had never manufactured anything (Tr. 1389), was in a position to "improve" the manufacturing methods of a billion dollar diversified company with Singer's more than a century of experience is not explained (PX 144 at 4, 30, 33; PX 18A at 3); nor does Singer point to any contemporaneous words or conduct of either party as evidence of this improbable interpretation. Instead, Singer relies on a legal argument in a memorandum of law submitted at an earlier stage of this litigation, which it characterizes as an "admission" by Perma that nothing more than manufacturing advice was contemplated (S. Br. 27). The arguments of counsel in support of an alternative theory of the case during early pre-trial proceedings are, of course, nothing of the sort.⁴³ If they were, however, Singer's "admissions" are at least equally probative, and

43. This point is discussed in greater detail in response to Singer's other claims of "admissions" by Perma, pp. 45-47, *infra*.

Singer, in its memorandum of law submitted to Judge MacMahon, stated that

"Obviously, it was contemplated that considerable time would be spent after the contract was entered into in attempting to perfect the device . . . and that is why paragraph 10 [deferring Singer's duty to promote sales until 1966] is based on the assumption that Singer would not be in a position to manufacture, market, and exploit the product until 1966."⁴⁴

2. *Singer's Distortion of the Contemporaneous Words and Conduct of the Parties*

Singer, in an effort to persuade this Court to substitute its judgment of the weight of the evidence for that of the trial court, has ignored the principal facts supporting its findings, and instead tries to torture a different "intent of the parties" from a highly selective catalogue of their "words and conduct." Not all of the "words and conduct" cited are contemporaneous, and not all are matters admissible on the issue of intent. We deal with the specific matters relied on by Singer in the order in which they are discussed by Singer (S. Br. 21-27).

"Singer's Words and Conduct"

1. Although Kloby did indeed predict on October 21 that "shipments should resume before the end of October" (S. Br. 22), they in fact did not, and the few shipments

44. R. 55 at 13-14, emphasis added. The same memorandum conceded that

"as of December 21, 1964 . . . no marketable units which could be shipped and no viable component parts from which new units could have been manufactured were in existence." *Id.* at 12

and that

"units" . . . were known to be unmarketable at the time the contract was entered into." *Id.* at 13

and argued that Singer's

"duties . . . were clearly confined to testing, removing and curing defects known to exist . . . and attempting to produce a marketable product in cooperation with Perma." *Id.* at 14.

made thereafter also were promptly recalled (*supra* at p. 35). Kloby's unwarranted optimism in October thus does not vitiate his knowledge on December 21, 1964 of the problems that then remained unsolved.

2. Although Hough in his December 11 memorandum predicted sales of 50,000 units in 1965 (S. Br. 22 citing PX 59), he acknowledged that problems previously encountered had prevented meaningful shipment of product to date and driven Perma to the edge of bankruptcy and, significantly, did not make any claim that such problems had been solved (PX 59 at 2). Within days of writing this memorandum, Hough met with Romel for a technical evaluation of the product, and learned of several problems for which a variety of solutions were only beginning to be tested, a separate problem which Romel told him he had not solved but had only avoided, and the possibility of additional then undetected problems because Romel lacked access to field testing information (*see* pp. 13n. 12, 36, *supra*). Thus, if 50,000 units were not shipped precisely by the end of 1965, it was because of a lack of realism in Singer's predictions, not a lack of intent to perfect the device. Interestingly, the same December 11 memorandum from Hough to Kircher shows that Hough's estimate of the cost of perfecting the product was not significantly different from Goor's, although it is true that the *quality* of work he envisaged was not "remotely similar" to that described by Goor (*see* pp. 22-27, *supra*).

3. Although Romel did indeed boast to his superior of his success in resolving "all of the known problems" with the device (S. Br. 22), that is far from all he told Hough, who as a better qualified engineer than Romel, knew better. Hough had already been told of untested changes in components, unsolved problems, and Romel's lack of access to field testing data, and at this very time saw the Hill Report (Tr. 6907), from all of which the need for further perfection and testing was one inescapable conclusion.

4. and 8. Although Singer was able to find a distributor (Monitor) willing to guarantee the number of units it

would "take" during 1965, the contract expressly provided that Singer was under no commitment to deliver any number of units and would incur no liability for failing to do so (PX 64, §13 at 10). The fact that Singer drove a favorable bargain with its distributor⁴⁵ hardly supports the inference that Singer had reason to believe it could deliver the number of units Monitor was bound to accept, in that year. Moreover, the amount Monitor was obligated to spend on sales promotion in 1965 was to be reduced in proportion to Singer's failure to deliver product (PX 64, §2 at 3). More probative is the fact that Singer expressly avoided obligating itself to spend money on sales promotion until 1966 (PX 60A, §10 at 13).

5. Singer next argues that since recovery of its investment of \$1.4 million in inventory was a primary inducement for it to enter the December contract, no redesign was contemplated which would have rendered that inventory obsolete. However, Singer knew of the need to change the Perma-Vac before it entered into the December contract, as is demonstrated both by its knowledge of the incorporation of disc and self-adjusting brakes on new model cars (PX 57 at 6; Tr. 4419-20) and Romel's asking for redesign suggestions to increase Perma-Vac pressure only two days after the December contract (PX 65A at 2).⁴⁶

6. Singer's claim that it "resumed production" after the December contract is based on Romel's single statement that "production or *assembly*" was resumed "a couple of days, maybe a week" thereafter (S. Br. 23 citing Tr. 4517). He was not asked whether such assembly was for purposes of testing his recent hardware modifications.

45. Kloby's analysis of the risks involved in Singer's undertaking to market, rather than merely manufacture, the product, pointed out that "after 50,000 units the risk element becomes relatively small." (DX 191 at 5).

46. The need for some redesign does not, of course, mean that the entire inventory would have been rendered obsolete. Redesign of the Perma-Vac involved only \$71,000 of the \$1.4 million worth of inventory held by Singer. See DX 603 (Perma-Vac—\$31,000, piston spring—\$23,000 and leather backing—\$17,000).

In any event, it is clear that immediately after December 21, 1964, Singer was asking Perma for design changes (PX 65A at 2); making changes on its own (pressure switch) and continuing to test changes made only days before (gear box and sensing unit) (*supra* at pp. 17-18).

7. The January 7, 1965, Phelps letter relied on by Singer (S. Br. 23, citing PX 62) would appear to be no more than a typical executive admonition to a factory manager to spend no more than necessary, for that is how it was responded to (*see* PX 63). Moreover, a portion of Phelps' letter, not quoted by Singer, recognized that the product was not yet satisfactory, warning against the use of Singer's name thereon "until [you are] satisfied product warrants use of name" (PX 62). In any event, assuming that the million-dollar commitment referred to in Phelps' letter was the same as that in Torello's December 21 memorandum, he too contemplated that Singer would spend at least \$306,000 in 1965 in modifying anti-skid components, technical services and start up (*compare* PX 62 with PX 120).

"Perma's Words and Conduct"

The extent to which Singer must strain to support its theory of intent is nowhere more strikingly illustrated than in the section captioned "Perma's words and conduct" (S. Br. 24-26). Although the ten numbered paragraphs create the illusion of quantity, only three of the items listed relate to contemporaneous words and conduct (§§2, 3 and 4), and two of these are the hearsay statements of a dead man. The remaining "words and conduct" are either altogether outside the relevant period (§§1, 5) or consist of legal arguments at various stages of this litigation, which Singer, for want of any other record support for its position, tries to torture into "admissions" (§§6-10).

1. Singer argues that since Perma, in late 1963, had ordered 50,000 units from Worcester, it "did not come to Singer for assistance in redesign" (S. Br. 24). There is, of course, substantial testimony that as a result of the

numerous problems encountered at Worcester in the attempted conversion from prototype to mass production, Perma sought from Singer and the latter offered its expertise in this area (*supra* at pp. 9-11). In any event, whatever the parties thought when they came together initially in February, 1964, does not cast light on, let alone determine, what they intended ten months later when the need to perfect the product was apparent to all (*supra* at pp. 17-18).

2. The "fail-safe feature" designed by Perrino and referred to in the film satisfied his understanding of the term "fail-safe," although not the criterion of absolute fail-safety enunciated by Singer after it decided to get out of the brake business (*see* pp. 10 n.9 and 28-30 *supra*). The evidence was overwhelming that Singer knew, before December 21, 1964, that the existing fail-safe features did not make the device absolutely fail-safe (*see* pp. 14-16 *supra*).⁴⁷

3 & 4. Perma's marketing vice president, Sam Karp, is quoted on the subject of an advertising program and the alleged state of production in November and December 1964 to indicate Perma's supposed intent to market product immediately. Unfortunately, Karp died long before trial and could not be examined as to the extraordinary inaccuracy of the statements relied on by Singer such as "product is in high production" (when there was none) and "quality and performance is great" (when Singer itself knew the contrary) (*see* pp. 16-19 *supra*).

5. The excerpt from Perma's February 1965 letter to its shareholders describing its expectations that royalties were anticipated "in the near future" is scarcely determinative of intent two months earlier. "In the near future" is certainly not inconsistent with a need to perfect in the interim, and the very indefiniteness of the phrase

47. *See also* the opinion of Judge Metzner denying a third Singer motion for summary judgment herein on the ground that "it is perfectly obvious from the record and the prior opinions that the defendant [Singer] could not have been under any delusion that the product was failsafe . . ." *Perma Research & Dev. Co. v. Singer*, 66 Civ. 665 (S.D.N.Y., May 15, 1970) (Metzner, J.), R. 69 at 4.

is underscored by the fact that no attempt was made in the letter to project an amount of royalties to be realized in 1965, 1966 or 1967 (DX 409).

6. However artlessly, the complaint herein did allege a cause of action for breach of the December contract. That it was not a model of clarity as to the details of that breach did not make it any less "a short and plain statement of the claim showing that the pleader is entitled to relief," FED. R. CIV. P. 8(a), and Judge Bryan so held (R. 18 at 15). That Perma, at earlier stages of this case, also demanded "relief in the alternative or of several different types," FED. R. CIV. P. 8(a), is irrelevant; from and after Judge MacMahon's decision, Singer was under no illusions as to Perma's theory of the case.

7-9. Singer quotes an earlier legal theory of Perma's from an affidavit and a statement under Rule 9(g)⁴⁸ submitted by Perma in 1969 in opposition to Singer's second motion for summary judgment and from a 1971 memorandum of law.⁴⁹ Elsewhere in its brief on appeal, Singer characterizes the argument in these three documents as "binding admissions" (S. Br. 18). None of them is anything of the sort, and none of them is probative on the issue of the intent of the parties at the time the December contract was entered into.

The quoted portion of Perrino's affidavit was properly characterized by Judge MacMahon as nothing more than an "argumentative conclusion," 308 F.Supp. at 748, n. 13.

48. General Rules of the Southern and Eastern Districts of New York.

49. Perma's memorandum of law quoted by Singer at p. 26 of its brief, although not the same as that it quoted at pp. 17-18, expresses the same legal theory. However, it does not do so, as Singer implies, as an expression of a contention being advanced in 1971, but to summarize the theory it had espoused before Judge MacMahon two years earlier. In selectively quoting from the memorandum, Singer misleadingly omits reference to the fact that therein Perma expressly stated its "abandonment of its [former] position . . . as a contention [to be advanced] at trial" (R. 171 at 8). Accordingly, excerpts from this memorandum are even farther removed from "binding admissions" than those in the earlier memorandum.

Such statements, if they have any evidentiary value at all are "not in any sense final or conclusive," 4 WIGMORE, EVIDENCE §1059 (Chadbourn rev. 1972). Judge Augustus Hand in *Ira S. Bushey & Sons, Inc. v. W. E. Hedger & Co.*, 40 F.2d 417, 418 (2d Cir. 1930) stated the rule still followed in this Circuit:⁵⁰

"An admission, except when formally made at trial, even if by a party *in propria persona*, is at most only evidentiary matter which may be rendered nugatory by other evidence in the case." (Emphasis added.)

The brief and Rule 9(g) statement embodied Perma's 1969 theories of the case which, like Singer's, necessarily changed during eight years of pre-trial litigation and discovery. Such statements made by an attorney are not "evidential admissions" and are binding only if they rise to the level of "formal admissions in the pleadings in the case, or stipulations . . ."—otherwise known as "judicial admissions," McCORMICK, EVIDENCE §262 at 630 (2d ed. 1972). Unless entered into with "formality and conclusiveness," they will not bind a party. *Berner v. British Commonwealth Pacific Airlines Ltd.*, 346 F.2d 532 (2d Cir. 1965), *cert. denied*, 382 U.S. 983 (1966).⁵¹ "The doctrine of judicial admissions has never been applied to counsel's statements of his conception of the legal theory of the case." *New Amsterdam Casualty Co. v. Waller*, 323 F.2d 20 (4th Cir.), *cert. denied*, 376 U.S. 963 (1963).⁵² Accordingly, counsel's statements in its legal memorandum are

50. See, e.g., *Giaraffa v. Moore-McCormack Lines, Inc.*, 270 F.Supp. 342 (S.D.N.Y. 1967).

51. In the *Berner* case, the court refused to hold a party bound by its attorney's closing statement to the jury even though it virtually conceded his client's failure to meet its burden of proof.

52. In that case, a judgment was entered for plaintiff based on a ten-year statute of limitations governing actions to enforce resulting trusts. The Court of Appeals reversed for retrial on the ground that the controlling statute was a three-year statute relating to fraud. After a second plaintiff's judgment, defendant sought reversal on appeal on the ground that plaintiff in the first action had insisted it was not claiming fraud, that it was entitled to judgment even though there had been no fraud and had stipulated to the inapplicability of the

not judicial admissions, viewed as assertions of fact, *Taylor v. Allis-Chalmers Mfg. Co.*, 320 F. Supp. 1381, 1385 (E.D. Pa. 1969), *aff'd per curiam*, 436 F.2d 416 (3d Cir. 1970) (pre-trial memorandum).

There are equally persuasive reasons for not applying the doctrine of judicial admissions to the Rule 9(g) statement of a party opposing summary judgment. The rule requires the party moving for summary judgment to state the material facts as to which it contends "there is no genuine issue to be tried"; the opposing party, in turn, is required to state those facts "as to which it is contended that there exists a genuine issue to be tried" and

"All material facts set forth in the statement required to be served by the moving party will be deemed to be admitted unless controverted by the statement required to be served by the opposing party."

Perma's Rule 9(g) statement expressly and undeniably controverted the facts claimed by Singer on its motion for summary judgment (R. 51 at 1). Accordingly, by the rule's very terms, it admitted nothing.

Finally, of course, if the intent of the parties to the December, 1964, contract were to be proved by legal arguments advanced by their counsel years later, Singer's "admission" that

"... it was contemplated that considerable time would be spent after the contract was entered into in attempting to perfect the device . . . and that is why paragraph 10 [deferring Singer's duty to promote sales until 1966] is based on the assumption that Singer would not be in a position to manufacture, market, and exploit the product until 1966."

(R. 55 at 13-14, emphasis added) stands on at least equal footing with any position Perma may have taken.

judgment. Rejecting defendant's argument, the court made the observation quoted above in the text and characterized defendant's position as an attempted "reversion to an earlier day when claims and defenses of merit were forfeited by a misstep in the negotiation of tortious procedural paths." *Id.* at 24-25.

10. Finally, Singer quotes Perrino out of context in support of the conclusion 'that in December, 1964, he did not have in mind any 15-month development program' (S. Br. 26). As we have already pointed out, pp. 22 n.24, 23 *supra*, perfection of the device did not in any event require a "15-month development program," so that, of course, none of the parties had that in mind. Perrino's testimony that his invention was "workable, usable and marketable" clearly referred not to mass-produced units, but to handmade prototypes (Tr. 1351-53). That is why he was able to testify that the "*design*" was ready for mass production but that the hardware had not, as of December 21, 1964, been successfully converted from prototype to mass production (Tr. 1353). This essential distinction between the design of an invention as embodied in a handmade sample and the design as modified to permit mass production is conveniently ignored by Singer.

From the foregoing discussion, it is clear that none of the evidence of the words and conduct of the parties cited by Singer shows the findings of the District Court to be clearly erroneous, and most of it, when placed in context, actually supports those findings.

B. Judge MacMahon's Denial of Summary Judgment Was Correct, and His Ruling Is in any Event Mooted by the Subsequent Full Trial of the Issues.

Singer's second motion for summary judgment, denial of which is here appealed from, sought a ruling that, as a matter of law, the December 21 contract did not impose upon Singer an obligation to perfect the Perma anti-skid device. Judge MacMahon agreed with Judge Bryan that the contract "neither permits Singer to sit idly until 1966 nor requires it to start manufacturing or shipping at once . . . [but] obligates Singer to use its best efforts to manufacture and market the product," 308 F.Supp. at 748. He then held that "'[b]est efforts', like 'reasonable care,' is a

term which necessarily takes its meaning from the circumstances"⁵³ and defined it as follows:

"'best efforts' here means that Singer was required to continue collaborating with Perma for a reasonable length of time in a good faith effort to solve the problems then preventing marketing of the product."

Whether Singer's performance met that standard was clearly an issue of fact for trial, *see* 308 F.Supp. at 749, but Judge MacMahon, like Judge Bryan before him, found the *existence* of Singer's obligation so clear that he did not consider this to be one of the issues of fact remaining for trial.

Singer now seeks a reversal of Judge MacMahon's ruling on the existence of the obligation and asks this Court to hold as a matter of law that there was no such obligation, on the basis of Perma's supposed "admissions" that Singer had no duty to perfect the product. We have already pointed out that the statements on which Singer relies do not rise to the dignity of judicial admissions and are in any event contradicted by Singer's own concession that it did contemplate perfecting the device, *see* pp. 39-40, 47 *supra*. If this material is entitled to any consideration at all, the *most* that it shows is that, at the time of Judge MacMahon's ruling, the issue whether the parties intended Singer to use its best efforts to perfect the device turned on questions of fact requiring trial. That very issue was in fact fully tried before Judge Duffy, and the existence of the obligation overwhelmingly established, as set forth in point A, pp. 32-40 *supra*. Therefore, if Judge MacMahon erred in holding, on the record before him, that the contract

53. 308 F.Supp. at 748. Those circumstances included "the background of defects of both the quality and design of the product, which the parties had experienced over a six-month period while ~~statute of limitations applicable to fraud.~~ In affirming the second operating under the June 1964 contract," the fact that the parties continued their attempts to solve the defects immediately after the December contract, the simultaneous execution of a technical services contract under which Perma was to furnish engineering assistance to Singer and the postponement of Singer's obligation to spend money promoting the product until 1966, 308 F.Supp. at 748-49.

obligated Singer to use its best efforts to perfect the device, any such error was mooted by the subsequent trial at which the fact of the parties' intent was overwhelmingly proved.

This point is nowhere more clearly illustrated than in *Reback v. Story Productions, Inc.*, 9 App. Div. 2d 880, 193 N.Y.S.2d 520 (1st Dep't 1959), *aff'g* 15 Misc.2d 681, 181 N.Y.S.2d 980 (Sup. Ct. N.Y. Co. 1958), the facts and holding of which are inaccurately stated by Singer, S. Br. 20-21. In that case the seller of certain literary property rights sued the buyer for failure to exploit the rights conveyed, on the theory that the contract imposed an implied obligation on the buyer. The buyer pleaded by way of affirmative defense that its only contractual obligation was to pay the purchase price. The plaintiff then moved to dismiss the defense for legal insufficiency, seeking a determination, in effect, as a matter of law that the contract imposed certain very specific obligations on the buyer, including, for example, the obligation to produce a motion picture. Special Term denied the motion, finding that although an implied obligation existed, its scope remained for trial, 181 N.Y.S.2d at 983.⁵⁴ The Appellate Division affirmed, but defined the issues for trial to include the existence of the implied obligation as well as its scope, 193 N.Y.S.2d at 522, quoted in S. Br. at 21. Thus, although the lower court construed the contract as imposing an obligation, as Judge MacMahon did here, the appellate court did not adopt an opposite reading as a matter of law, as Singer asks this Court to do; it held only that the question remained for trial. If, in this case, Judge MacMahon's determination of the existence of Singer's implied obligation was likewise "premature," the only consequence was that the issue should have been tried, and it was. Singer has had its day in court on the issue of intent, and cannot escape the consequences on the basis of technical claims of error by which it was not prejudiced in any way.

54. "The difficulty, in this case, is in determining whether defendant's implied obligation was to produce (or cause the production of) a motion picture and to exploit the television and radio rights, or only to use its best efforts to do so."

**C. The Trial Court Properly Excluded Singer's
Proffered Evidence of the Subjective Beliefs of
Individual Witnesses as to the Parties' Intent.**

Where the intent of the parties to a written contract does not clearly appear from the words of the instrument, the trial court must look to the negotiations leading up to the execution of the contract, and other circumstances surrounding its execution, to determine the factual issue of intent. 4 WILLISTON, CONTRACTS (3d ed. 1961), §601 at 310-11; see generally *id.* §§623, 629, 630. Williston summarizes the kind of evidence which may properly be considered:

"This extrinsic evidence may take the form of an oral understanding, prior negotiations, the conduct of the parties under the agreement, 'custom and usage,' and any pertinent circumstances attendant upon the transaction."⁵⁵

The issue of the parties' intent was fully tried here, and the evidence adduced, discussed in detail above, pp. 32-40, covered the entire range of evidence competent and relevant to the determination of contractual intent.

Although Singer asserts that the court below "repeatedly and systematically refused to allow evidence relevant to the parties' intention at the time of entry into the

55. *Id.* at 310-311 (footnotes omitted): accord, 3A CORBIN, CONTRACTS §562 (1960). Singer's reliance on *Eastern Electric, Inc. v. Seeburg Corp.*, 427 F.2d 23, 26-27 (2d Cir. 1970) (S. Br. 19-20) is misplaced, for the same reasoning that precluded liability on the very different facts of that case supports the District Court's findings here. This Court held that, in determining whether a contract covering the sale of a vending machine business included an implied covenant to exploit certain patents, the trial court had correctly considered the negotiations of the parties, including prior drafts of the agreement, as well as contemporaneous transactions between the parties, 427 F.2d at 26, 27. During negotiations, however, a provision similar to the one sued upon here had been expressly proposed, and rejected. This Court affirmed the trial court's finding that no implied agreement was intended on the ground, among others, that their words and conduct expressly negated any such intent. Compare *Wood v. Lucy, Lady Duff Gordon*, 228 N.Y. 88, 118 N.E. 214 (1917). Applying the same criteria to this case, the evidence compels the opposite conclusion.

December contract," the only evidence whose exclusion is complained of relates entirely to the then unexpressed subjective beliefs of individual witnesses (S. Br. 28-29). In support of its argument that this evidence should have been received, Singer relies on only two cases (S. Br. 29), neither of which involves either a bilateral contract or an implied obligation of any kind. *Epstein v. Cuba*, 25 App. Div. 2d 680, 268 N.Y.S.2d 947 (2d Dept. 1966), involved a question of a depositor's donative intent on the creation of a joint savings account and *Sowalsky v. E. F. MacDonald Stamp Co.*, 31 App. Div. 2d 582, 294 N.Y.S.2d 1016 (3d Dept. 1968) involved a question of a landlord's intent when he performed the unilateral act of accepting an envelope from a hold-over tenant. Neither of these cases is relevant to the determination of intent of the parties to a written contract. The issue is not one of evidence, but of substantive law, see 7 WIGMORE, EVIDENCE §1967 (3d ed. 1940); 4 WILLISTON, CONTRACTS §610B at 532-33 (3d ed. 1961). Singer cites no case suggesting that the subjective beliefs of individual witnesses are relevant or admissible for this purpose, and the law is to the contrary, *Mencher v. Weiss*, 306 N. 1, 7-8, 114 N.E. 2d 177 (1953).

The present expression of reconstructed and previously unexpressed subjective beliefs ten years after the event is of little probative value under any circumstances.⁵⁶ Here, where the intent of the parties was overwhelmingly established by the evidence of their contemporaneous words and conduct (*supra* at pp. 32-48), the exclusion of testimony concerning the past state of mind of individuals was well within the District Court's discretion.

56. Where, as here, the contracting parties are corporations, the wisdom of the traditional rule is particularly apparent. If subjective evidence were relevant, whose belief should control: the senior executive who has limited knowledge of the relevant circumstances who approves the contract in principle (Hough), the middle-management executive with greater personal knowledge who negotiates the contract (Kloby), or the employee who is charged with the responsibility for getting the facts but does not participate in the negotiations (Romel)? Interestingly, Singer did not even attempt to elicit the beliefs held by its negotiator Robert Kloby in December, 1964 (Tr. 5892, 6097-98, 6098-6110a).

D. Singer's Breach Is Not Excused by Virtue of Its Argument that the Perma Device Did Not Meet Singer's Standard of Absolute Fail-Safety.

Despite the rejection of Singer's definition of fail-safety by the automotive industry, its own expert and the trial court (Op. 26, 36-37; *supra* at pp. 21, n. 22, 28-30; Tr. 2583-85, 7111-12), Singer continues to urge its applicability to the Perma device. The argument advanced on appeal is that the anti-skid devices of the original equipment manufacturers ("OEM") were "inherently more reliable than" what Singer characterized as Perma's "add-on aftermarket device" and for this reason the Perma device should have to meet Singer's absolute standard of fail-safety (S. Br. 30, 31). Singer's argument rests on a misstatement of the record below and on the wholly unsupported assumption that different standards of marketability were established at trial for the "original equipment" and "aftermarket" segments of the automotive industry.

1. Singer's Misstatement of the Record

Singer's claim rests in part on the erroneous statement, for which no record reference is given, that the evidence established that, unlike the Perma system, the OEM systems "were designed for installation in a specific make of car" and were thus "inherently more reliable" (S. Br. 30). However, the evidence established just the opposite. The Kelsey Hayes device was designed for installation on the following different makes and models: Mercury, Thunderbird, Lincoln Continental, Mark III and Mark IV cars (Ct. X 6 at 1 and at 8, 10, 11 of Ex. A thereto; PX 121 at 18; Tr. 2297, *see* Tr. 2655). The Bendix device was designed for installation as a 4-wheel control on the Chrysler-Imperial and as a 2-wheel control on the Travelall, a vehicle built by International Harvester (Ct. X 6 at 1 and at 8, 10 of Ex. A thereto; Tr. 6379-81, 6999-7000, 7002-03). The General Motors device was designed for installation on the Cadillac Eldorado, the Cadillac, the Oldsmobile Toronado and the Buick Riviera (Ct. X 6 at 1 and at 8, 10, 11 of Ex. A thereto; Tr. 6386-87). In short these devices, like

Perma's, were designed for installation on a number of different cars. Moreover, the testimony of the only witness through whom Singer sought to prove that the Perma device was less reliable than those later made by the OEM, its expert Stanley MacDuff, was rejected by the trial court as "far from impartial," "suspect" and otherwise unworthy of belief⁵⁷ (Op. 43-44), and those findings are not challenged on this appeal.

Lacking evidentiary support for its claim, Singer resorts instead to speculation. With not a single record reference, Singer asserts that the OEM devices were installed "in the factory . . . subject to all of the quality control and inspection which manufacturers employ" whereas "in the aftermarket at which the Perma device was aimed . . . installation would be by mechanics of questionable experience . . . without the resources for inspection and testing available at the factory" (S. Br. 36). There is not a scintilla of evidence in support of this conjecture. Singer's trial attorneys simply never sought to prove what kind of quality control or inspection techniques exist either in the factories of the OEM or in the aftermarket; nor did they seek to offer any proof as to the level of expertise required to install and test an anti-skid device. In short,

57. Indeed, the proof at trial established the substantial similarity between the Perma device and those later marketed by the OEM. All contain a vacuum-operated modulator that is moved by vacuum air pressure differential (PX 121 at 12, 13; 155 at 5-58; 156 at 5-60 and 5-61) which displaces hydraulic fluid and closes a check valve causing release of over-braked wheels in a rhythmic manner, at approximately 3-4 cycles per second (*ibid.*, Tr. 7025-28, 7096). The OEM devices, like the Perma device, each employ such mechanical parts as check valves, solenoids, air valves, bleeder holes, filters, pistons, springs, "O" rings and hydraulic seals (PX 121 at 12, 13; 155 at 5-58; 156 at 5-60 and 5-61). The principal difference between the Perma and OEM devices is that the Perma sensing unit is electro-mechanical, using such components as a classical governor with an overriding fly wheel effect (PX 8-13), while the OEM devices, developed later, use fragile electronic components (PX 154 at 23; Tr. 7228) in a control module to direct the release and reapplication of brakes. Although MacDuff on direct examination pointed to numerous features which he claimed made the Perma device less reliable than the OEM devices, on cross-examination he admitted that the OEM devices were subject to precisely the same failures as the Perma device (*see, e.g.*, Tr. 7068-69, 7087, 7101-12).

the argument here raised for the first time rests solely on the imagination of Singer's appellate attorneys.

In an effort to supply some support for its argument, Singer misstates part of Goor's testimony and distorts the remainder it purports to quote. As part of the pre-trial proceedings herein, Singer was required to furnish Perma with a statement of the particular characteristics of the anti-skid device which it claimed made the device unmarketable (PX 122 at 4; Tr. 2548-50). Plaintiff's expert Goor, when asked whether he agreed with Singer's contention that

"The Perma system could not as intended by the inventor to [sic] be safely and properly integrated into the different braking systems of a broad variety of vehicle makes and models under the range of environmental brake system conditions reasonably to be expected" (Tr. 2567-68),

testified in a manner quite contrary to that attributed to him by Singer. He did not testify simply "I really don't think I can answer," as Singer purports to quote him as saying (S. Br. 30); what he said was: "*With proper effort it probably could*, but I really don't—can't say" (Tr. 2568, emphasis added). The question and answer do not even relate to fail-safety but to whether the Perma device was adaptable to all vehicle makes and models. As to that, Goor was saying no more than that he could not express a definitive opinion without actually testing the device on numerous different cars. His expert judgment, however, was that the Perma device probably could be integrated into such different cars, and that is the portion of his testimony which Singer misleadingly omits.

Singer's remaining quotation from the record, although disguised to appear as evidence, was nothing of the kind. The subject matter of the question put to Goor was another of Singer's contentions, as follows:

"Installation of the device on vehicles by persons other than the original manufacturers of the vehicles

resulted in unreasonable hazards to the users of the vehicle." (Tr. 2572)

Because agreement or disagreement with this contention would necessarily involve speculation as to the qualifications of OEM and aftermarket personnel, the question asked of Goor was posed as follows:

"I gather you can't express an opinion on that statement?" (Tr. 2572)

The Court then stated "How can he?" and Goor testified "I really cannot" (Tr. 2572). Certainly Singer cannot now substitute this collective acknowledgment that the question called for speculation by the witness for its failure to introduce evidence concerning the qualifications of mechanics in the aftermarket, the degree of difficulty involved in installation of anti-skid devices or the unfeasibility of preparing easily understood installation instructions.

2. The Automotive Industry's Standard of Fail-Safety

Singer's claim that aftermarket products must satisfy its absolute standard of fail-safety (S. Br. 31)—which it concedes is not applicable to the original equipment segment of the industry (S. Br. 3C)—is contradicted by the record. The extensive evidence on the degree of fail-safety which must be incorporated into an anti-skid device to make it marketable clearly established the existence of a single standard applicable to the automotive industry as a whole (Tr. 2448-51, 2480-81, 2483-84, 2320-21 (Goor); Tr. 6700-01, 6705, 6708-09 (MacDuff)). The criteria for marketability developed by Goor at Kelsey Hayes were clearly not limited to the products of the original equipment manufacturers. On the contrary, he testified that an anti-skid device which satisfied the criteria he had enumerated "would be marketable *generally* in the *automobile industry*" (Tr. 2450-51, *emphasis added*).⁵⁸ Indeed, at

58. The fail-safe criterion which Goor testified applied "generally in the automobile industry" was that an anti-skid device must be equipped with a time-delay switch or valve which was designed to bypass the device and restore normal braking if the modulator diaphragm remained retracted beyond a pre-determined period (Tr. 2448-51, 2476, 2480-81, 2483-84, 2320-21).

trial, Singer and its expert MacDuff specifically rejected the suggestion that different criteria of marketability might apply to the OEM and aftermarket segments of the automotive industry (Tr. 6708-09).

Moreover, the uncontradicted evidence established that Singer's standard of fail-safety was not only unattainable but never adopted by any manufacturer of an anti-skid device. Goor testified that Singer's absolute standard had never been applied "in the automobile industry" (Tr. 2584) and that no "anti-skid device currently being marketed . . . meets that standard (Tr. 2585). MacDuff, Singer's own expert, agreed that no anti-skid system then or previously marketed satisfied Singer's definition of fail-safety (Tr. 7111-12). In fact, he conceded that it was virtually impossible to build an anti-skid device to satisfy that standard (Tr. 7112, 6571). Indeed, as the trial court observed, "The only mechanical device which might meet this test" is a "wedge"—a tool with no moving parts (Op. 36-37).

Faced with overwhelming evidence that its standard of fail-safety does not in fact apply to any segment of the automotive industry, Singer urges, quite erroneously, that it should nonetheless control, apparently as a matter of law, since it "has been written into the New York statutes with respect to brake systems" (S. Br. 31 citing N.Y. VEH. & TRAFF. L. §382-b (McKinney 1970)). That statute, however, does no such thing. It simply requires that post-1967 model cars be equipped with a "dual braking system" (Message of the Governor on Approving L. 1966 c. 210 (April 25, 1966), 1966 SESSION LAWS OF N.Y. 2987 (McKinney 1966)). By definition, the dual braking systems in use today do not meet Singer's standard of fail-safe. Singer claims that a braking device must be "absolutely fail-safe" (S. Br. 9) and that fail-safe precludes the possibility that a malfunction "will cause a *partial* or total loss of brakes" (S. Br. at 7).

A single braking system applies braking power to all four of a vehicle's wheels (Tr. 187-89; PX 5A). In a dual

braking system, each system applies power to only two of such wheels (Tr. 2845). A loss of one such system obviously leaves the vehicle with a partial loss of brakes, and with less braking power and efficiency than a functioning single braking system.

Singer's reliance on the New York statute is in any event misplaced because the statute does not prescribe the standards, much less the standards of reliability, of the components of a braking system, it simply requires that there be two such systems operating independently of each other.⁵⁹

3. Singer's True Reason for Abandoning the Perma Device

Although Singer claims it was the Perma device's lack of fail-safety which led it to abandon its contract (S. Br. 10, 27), the evidence establishes that the device could readily have been made fail-safe and that Singer had quite different reasons for abandoning it.

The undisputed testimony of Goor established that all that was needed to make the Perma device fail-safe by

59. The relevant statutory language (none of which is quoted by Singer) provides that cars after 1967 must be equipped with

"... a service brake system of such design that rupture or failure of an actuating force component of any single brake shall not result in complete loss of braking function." N.Y. VEH. & TRAFF. L. §382-b (McKinney 1970).

Throughout this portion of its brief, Singer alludes to Judge MacMahon's opinion at 308 F.Supp. 743 and states that he both "adopted" and "agreed" with Singer's definition of fail-safe (S. Br. 20, 31). Judge MacMahon, in denying Singer's motion for summary judgment, referred to a definition of "fail-safe" found in the Random House Dictionary of the English Language (1969) but did not purport to apply this standard of fail-safety to the automotive industry. Singer apparently does not contend that the dictionary definition referred to therein is controlling since that would be inconsistent with its basic point on this appeal (S. Br. 19). A suitable standard of fail-safety for the automotive industry was a factual matter which was rightly established by proof at trial. Accordingly, even assuming, *arguendo*, that the Random House definition accords with Singer's, it is not relevant to the issues raised on this appeal.

automotive industry standards was the installation in the modulator component of a time-delay switch or valve of the type used by each of the OEM (*supra* at pp. 21-22, 56-57). He testified that such devices were simple in design, easy to incorporate and well within the state of the engineering art in 1965 (*ibid.*). Indeed, a design of one such device was furnished to Singer by Perrino in November 1965 but not even analyzed by Singer's chief engineer Romel (Tr. 5782-85). That alone is sufficient to demonstrate that Singer had already decided to abandon its contract with Perma. Moreover, Singer executives never sought to ascertain from representatives of the automotive industry what standard of fail-safety was required (Tr. 3153, 3580, 3586).

The true reason Singer abandoned the Perma device was not because it could not have been made fail-safe, but because when new management took over responsibility for the project in the summer of 1965, they quickly and conclusively decided that Singer did not "want to be in the brake business" (Tr. 814; *see* pp. 28-30 *supra*). As Singer's executives stated in internal memoranda among themselves, "the automotive parts business is not an attractive business for Singer" and "it is doubtful whether a controlling position could be attained because of the purchasing power and engineering skills of the Big Three" (PX 99 at 6 and 8, *see* PX 88A at 2, PX 90A at 4). As a consequence, Singer formally abandoned its contract with Perma as soon as its executives believed they had constructed a plausible argument on which to state they relied.⁶⁰

60. Significantly, DiScipio, Singer's Vice President who assumed responsibility for the product in the summer of 1965 and who made the decision to abandon it, admitted as a witness that Singer's decision to divest itself of the Perma project was not based on a finding that the device was "technically not feasible" (Tr. 3651).

II

The Admission of Evidence Relating to Computer Simulations as Part of the Basis for the Opinion of Plaintiff's Expert Was a Proper Exercise of the Trial Court's Discretion.

The issue of perfectibility of the Perma device turned in part on the credibility of the parties' respective expert witnesses, who reached different conclusions after considering different factors, *compare, e.g.*, Tr. 2451-56 (Goor) with Tr. 7976-79, 7885-86, 7913-14 (Rabins). The court below, for the reasons stated in its opinion (Op. 42-44), believed the plaintiff's experts and, after "viewing all of the evidence" found "that the Perma Anti-Skid Device could have been perfected and made marketable with the proper engineering work done." (Op. 44).

Recognizing that questions of credibility are peculiarly the province of the trial court,⁶¹ Singer does not, on appeal, urge that this finding was erroneous. Rather, it seeks to overcome it by the indirect route of attempting to exclude evidence of the matters underlying the opinions of plaintiff's experts—specifically, printouts of the results of computer simulations which formed part of the basis of the opinion of plaintiff's expert Goor in assessing the perfectibility of the Perma device,⁶² and exhibits reflecting

61. *United States ex rel. Diblin v. Follette*, 418 F.2d 408, 411 (2d Cir. 1969); *accord*, *Zenith Radio Corp. v. Hazeltine Research, Inc.*, 395 U.S. 100, 122 (1969); *Langford v. Chrysler Motors Corp.*, 513 F.2d 1121, 1127 (2d Cir. 1975); *V & S Ice Machine Co. v. Eastex Poultry Co.*, 437 F.2d 422, 426 (5th Cir. 1971) (expert witnesses); *Macri v. United States*, 353 F.2d 804, 809-10 (9th Cir. 1965) (expert evidence; issue whether competent contractor could have performed despite design defect); *see also Sweeney v. American Steamship Co.*, 491 F.2d 1085, 1089-90 (6th Cir. 1974); *United States v. Compania Cubana de Aviacion, S.A.*, 224 F.2d 811, 820 (5th Cir. 1955); *Hedger v. Reynolds*, 216 F.2d 202, 203 (2d Cir. 1954).

62. Singer is of course completely incorrect in suggesting that Goor's testimony was based only upon the simulations (*see* S. Br. 45), since the other bases of his expert opinion, discussed below, p. 61, are clearly documented in the record (Tr. 2451-56; *see also* 2477-84, 2558, 2564-65).

the equations and other input data used in the simulations. Since all of Singer's arguments against admissibility are founded on the erroneous assumptions that the printouts were here "offered for the truth of the matter being asserted therein" (S. Br. 37) and that plaintiff's expert witnesses were called "to state the results of a computer's operations" (*id.* at 35), a brief examination of the nature of the evidence here in issue and the purpose for which it was offered and received is necessary before evaluating Singer's legal arguments.

A. The Nature of the Computer Simulation and the Purpose for Which the Evidence Was Offered

Plaintiff's expert Daniel Goor, who testified as to the automotive industry's criteria for marketability of an anti-skid device based on his experience at Kelsey-Hayes (Tr. 2443-51, 2717-22), evaluated the Perma device in light of those criteria and expressed the opinion that it could have been made marketable "if it wasn't at the time." (Tr. 2476). In reaching this opinion, Goor examined and relied on, among other things, the patents relating to the Perma device, diagrams, schematic drawings and models of the device and its various components, including proposed fail-safe modifications; documents relating to defendant's specific criticisms of the device (Tr. 2451-55); and the White, Cadillac and Ford reports (Tr. 2467, 2478), which related to actual empirical tests of the Perma anti-skid device (PX 19, 21, DX 12, Tr. 354). In addition, Goor retained Andre DeVilliers to perform a computer simulation of the device. DeVilliers had done previous work with computer simulations in the automotive, plastics and aerospace industries (Tr. 2891), specifically in connection with the development of an automotive anti-skid device while employed at Kelsey-Hayes (Tr. 2456). Goor instructed DeVilliers to model the Perma unit, using the vehicle model he had developed while at Kelsey-Hayes (Tr. 2456), and "simulate a battery of stops through various speeds and various road coefficients" both with and without the Perma anti-skid device (Tr. 2457). Goor specified

the road surfaces that DeVilliers was to simulate, with coefficients of friction ranging from that of an icy road or "wetted down painted surface" to a dry concrete road (Tr. 2457-59).

DeVilliers described the use of a computer in this context as "an engineering tool . . . , much like a slide rule" (Tr. 2891); "just a big calculator" (Tr. 2906; *see also* 2989-90; 4179). The elements fed into the computer for the purposes of calculation were (1) the *vehicle model*, a system of mathematical equations describing the motion of the vehicle (Tr. 2909, 2905-06), derived by applying the Runge-Kutta fourth order method of numerical integration, a standard process (Tr. 2906) to standard equations of vehicle dynamics developed in the 1920's (Tr. 2904);⁶³ (2) the *Perma model*, consisting of a series of mathematical equations (PX 134, 135, Tr. 2986) derived "by applying the laws of physics to the components of the Perma system" (Tr. 2984) as reflected in drawings and other documents in evidence;⁶⁴ and (3) "a friction model for the road" (Tr. 2988; PX 143, Tr. 3927). The computer then, using the fourth order Runge-Kutta numerical integration technique (Tr. 2991), carried out the calculations necessary to simulate stops on different types of road surface at the speeds specified by Goor (Tr. 2989). While the computations could theoretically have been done with pencil and paper, the "myriad number of calculations" involved made it more feasible to use the computer (Tr. 2991). PX 127, 128 and 129 are printouts of the results of those computations, based on three alternative hypotheses with respect to the gear ratio of the Perma device.⁶⁵

The validity of the vehicle simulation had previously been empirically tested by DeVilliers in simulations of the Kelsey-Hayes anti-skid device (Tr. 3021-22; *see also* 2644).

63. PX 132, 133 and 133A reflect the equations and numerical constants involved (Tr. 2963, 2968).

64. Tr. 2985; "the Singer document" referred to appears to be PX 131 (Tr. 3021).

65. Tr. 2991-93; the meaning of the columns of figures on these exhibits is explained at Tr. 2994-3014.

Although the Perma model could not be empirically validated because of the unavailability of any functional hardware (Tr. 3022) and the prohibitive expense of attempting to construct any for experimental purposes (Tr. 2466), both Goor and DeVilliers were satisfied as to its validity (Tr. 2655, 3022, 3869), on the basis of their familiarity with the Kelsey-Hayes device (Tr. 2655), understanding of the scientific principles underlying the Perma system (*see* Tr. 3022) and their own engineering knowledge (Tr. 3877). In modelling the Perma device, emphasis was on the basic engineering principles involved, not on the dimensions of individual parts or other such variables which could be readily changed. It was the soundness and viability of the fundamental configuration and the design concepts Goor and DeVilliers, with the aid of the computer, were analyzing (Tr. 2674, 3885).

The mathematical calculations performed by the computer in this case were not, then, intended to show the real-world performance of a specific piece of hardware, and the numbers shown on the printouts as reflecting the solutions to mathematical problems based on various hypotheses do not mean that a particular piece of hardware modelled on the Perma device would achieve a particular stopping distance in feet under the assumed conditions.

The documentary evidence reflecting the results of DeVilliers' computer analyses were not, then, "computer-generated evidence" (S. Br. 34, 35, 38n, 39) of "samples, surveys, summaries" (*id.* at 34); "analysis of data" (*id.* at 35) or "representations of a specific device" (*id.* at 36; *cf.* 41-44); neither were the printouts, as defendant persists in claiming, "offered for the truth of the matter being asserted therein" (*id.* at 37). This material was offered and received as part of the basis of Goor's expert opinion. Neither Goor nor DeVilliers was "a witness [called] to state the results of the computer's operations." (S. Br. 35). Goor was an expert who testified to his opinion concerning the marketability of the Perma anti-skid device and disclosed the bases of that opinion in the manner contemplated

by Rule 705 of the Federal Rules of Evidence; and DeVilliers was another expert who authenticated one of the bases of that opinion. The record is clear and unambiguous as to the nature of this evidence and the limited purpose for which it was received (Tr. 2462-63; *see also* 2461). The criteria by which its admissibility must be measured are, then, those applicable generally to expert opinion testimony and material forming the bases thereof. These criteria were correctly applied by the court below.

B. Defendant's Specific Objections to Admissibility Are Without Merit.

Defendant on appeal advances five arguments against the admissibility of the evidence relating to the computer simulations (S. Br. 32). The one principally relied on, the claim that Singer was prejudiced by nondisclosure of the program (S. Br. 34-40), is flatly contradicted by the record (Point 1 below). Its objections on grounds of hearsay (S. Br. 37) and lack of "foundation" (S. Br. 40-44) are based on a misconception of both the nature of the evidence and the purpose for which it was received (Points 2 and 4 below). Its argument that the simulations "contain obvious errors" goes not to admissibility, but to the weight of this evidence, a question outside the scope of appellate review (Point 3 below), and its final argument, alleged lack of pre-trial notice, is a sham (Point 5 below).

1. Defendant Was Not Prejudiced by Nondisclosure of the Program.

Singer's first line of attack on the reception of the computer printouts here involved and the exhibits reflecting the inputs is plaintiff's nondisclosure of "the program and other foundation materials" (S. Br. 34).⁶⁶ In an attempt to frame a standard for the admissibility of "computer simulations specifically" that will result in the exclusion

66. What "other foundation materials" Singer seeks are not disclosed. All other foundation materials it sought at trial had been made available (Tr. 2970, 2972, 3087) before Singer mentioned the program for the first time (Tr. 3086), some five months after defendant was first advised of the computer simulations, *see* pp. 80-82, *infra*.

of the evidence here involved, Singer argues that such evidence must satisfy foundation criteria of admissibility applicable to "samples, surveys, summaries and mathematical computations" offered to prove the truth of the matter stated (S. Br. 34). It is, however, well settled that the foundation requirements applicable to evidence offered substantively do not apply to evidence offered solely to demonstrate the basis for expert opinion, *Weymouth v. Colorado Interstate Gas Co.*, 367 F.2d 84, 91 (5th Cir. 1966); see also *United States v. Sowards*, 339 F.2d 401, 402 (10th Cir. 1964); *Reid v. Quebec Paper Sales & Transp. Co.*, 340 F.2d 34, 38 (2d Cir. 1965); FED. R. EVID. 703, 705; cf. *United States v. 421.89 Acres of Land*, 465 F.2d 336, 339 (8th Cir. 1972).

The three cases on which Singer relies are therefore irrelevant, since all three involved evidence offered to prove the truth of the matter stated, and none presented any issue relating to the bases of expert opinion. *United States v. DeGeorgia*, 420 F.2d 889 (9th Cir. 1969) (S. Br. 34, 35), a criminal trial for auto theft, involved computer-stored business records of an auto-rental company, offered to prove that the stolen car had not been rented during the period in question. In *United States v. Russo*, 480 F.2d 1228 (6th Cir. 1973), *cert. denied*, 414 U.S. 1157 (1974) (S. Br. 35), a mail-fraud case, summaries of computer-stored business records relating to doctors' claims for reimbursement by Michigan Blue Shield were offered to show the number of surgical procedures performed by defendants in comparison with those of all doctors in the state. *United States v. Dioguardi*, 428 F.2d 1033, 1038 (2d Cir.), *cert. denied*, 400 U.S. 825 (1970) (S. Br. 35), where defendants were convicted of fraudulent transfer of the property of a bankrupt meat company, did not involve business records, but the prosecution offered computer printouts to show the dates on which the bankrupt's inventory would have been exhausted on a FIFO basis.⁶⁷

⁶⁷ The opinions of "commentators" cited by Singer (S. Br. 34) are distinguishable in like manner. Roberts, *A Practitioner's Primer on Computer-Generated Evidence*, 41 U. CHI. L. REV. 254

In all of the three cases cited, computer evidence was in fact received *without* production of the program; none of them stands for the proposition that the production of the computer program is the "*sine qua non* for the admission of computer-generated evidence" (S. Br. 35), *even where such evidence is substantively offered*.

In the *DeGeorgia* case, not even computer printouts were offered, only the testimony of a witness as to the absence of any transaction involving the subject car, 420 F.2d at 891. The Government offered "foundation evidence as to input procedures," *id.* at 893, note 11. The concurring opinion, on which defendant primarily relies (S. Br. 34), discusses foundation requirements in greater detail, yet nowhere says that laying a foundation requires production of the program. In *Russo*, the Court of Appeals for the Sixth Circuit held that an adequate foundation was laid for the admissibility of summaries of computer printouts where qualified experts testified as to the accuracy of

(1974), repeatedly cited by Singer (S. Br. 34, 36, 37, 38), deals with computer-stored business records and other material offered for the truth of the matter stated, as does the partial quotation from FEDERAL JUDICIAL CENTER, MANUAL FOR COMPLEX LITIGATION, §2.717 (1973), which Singer has altered by addition of the words "(as a condition of admissibility [*sic*])" (S. Br. 34), which nowhere appear in the quoted sentence. Other non-judicial authorities cited in Singer's brief are even more remote. The document referred to as an American Bar Association "report" was a recommendation of a subcommittee of the Committee on Agency Rulemaking with respect to the use of "data processing machines" in rule-making proceedings by regulatory agencies, *Principles of Introduction of Machine-Prepared Studies*, C.L.R.S. §5-4.2, Article 2 (1964) (hereinafter cited as "*Machine-Prepared Studies*"). The recommendations (which do not appear to have been adopted by any federal agency) are not especially directed to criteria of admissibility in adversary proceedings, and are intended in part to "permit the agency to reproduce the study with a minimum of expense," for general research purposes, *id.* at 7. The other two law review articles cited by Singer strongly support the trial court's rulings here. Note, *Computer Software: Beyond the Limits of Existing Proprietary Protection Policy*, 40 BROOKLYN L. REV. 116 (1973) (S. Br. 35) (recognition of need for legal protection of proprietary interests of authors of computer programs); Note, *Computer Simulation and Gaming: An Interdisciplinary Survey with a View Toward Legal Applications*, 24 STAN. L. REV. 712 (1972) (S. Br. 32) (use of computer simulations to assist theory construction, as distinguished from duplicating real-world performance of a specific device).

the input and "the nature of the information which went into the machine and upon which its printout was based," 480 F.2d at 1241—precisely the foundation evidence which DeVilliers furnished here (Tr. 2964-70, 2984-88, 3926-27, PX 132, 133, 133A, 134, 135, 143). Again, there is no mention of the program. In *Dioguardi*, despite the dictum criticizing the Government's failure to produce the program quoted in S. Br. 35-36, a conviction based on the computer evidence admitted without production of the program was affirmed on the ground that:

"[i]t would . . . be unfair to the trial judge and a waste of the time of another judge and jury for us to direct a new trial for failure to compel production of the program unless there is an *appreciable risk that prejudice resulted*."

428 F.2d at 1038, emphasis added. From Singer's own authorities then, it is abundantly clear that even where computer-generated evidence is offered to prove the truth of the matter stated, there is no inflexible requirement that the computer program be produced as a condition of admissibility; rather, the question is whether any prejudice resulted from nonproduction.

Singer has utterly failed to show that it was in any way prejudiced by the nonproduction of the program in this case. Its only attempt to do so, in fifteen pages of argument against the admission of the evidence, is a short paragraph stating that it "could not effectively cross-examine DeVilliers about the simulations" without the program (S. Br. 37). This claim is flatly contradicted by the record.

Singer's argument is expressed in general, conclusory language, and refers to only one subject on which it claims the program would provide information essential to cross-examination: "the logical and analytical assumptions underlying the computer simulations" (S. Br. 37). DeVilliers was, however, cross-examined at great length on precisely what those "logical and analytical assumptions" were (Tr. 3067-86, 3712-3875). The extent of further cross-examina-

tion along these lines was accordingly within the discretion of the trial court in any event.⁶⁸

In particular, Singer cross-examined DeVilliers at length about what went into the program—for example, whether DeVilliers had considered it appropriate to simulate “the performance of the adapter gear as a gear meshing with another gear” (Tr. 3723), the “adapter shaft” (Tr. 3726), “freedom of motion of the adapter shaft relative to the gears in the gear box (Tr. 3727), “torsional elasticity of the flexible shaft” (Tr. 3729), “wind drag” (Tr. 3733), “oscillation of the flexible shaft” (Tr. 3736) and similar minutiae (*e.g.*, Tr. 3736-41; 3789-91). Production of the program would not, of course, reveal anything about the *correctness* of DeVilliers’ judgment concerning what to simulate, and particularly whether those choices were “deliberately biased to produce results favorable to Perma” (S. Br. 36); it would show only what choices he made, an issue on which he testified exhaustively.⁶⁹ Singer’s point on appeal seems to be precisely this, since it says

68. *United States v. Jenkins*, 510 F.2d 495, 500 (2d Cir. 1975) (not an abuse of discretion to curtail cross-examination on issue defendant had otherwise “effectively raised”); *United States v. Mobley*, 462 F.2d 69, 71 (2d Cir. 1972) (refusal to re-open cross-examination to permit questioning on newly-produced letter tending to show bias, where bias had already been inquired into); *accord*, *United States v. Kahn*, 472 F.2d 272, 280-81 (2d Cir.), *cert. denied*, 411 U.S. 982 (1973) (speculation that witness could have been successfully impeached upon further cross-examination, where other evidence corroborated his direct testimony, not sufficient to show abuse of discretion); *Howell v. American Live Stock Ins. Co.*, 483 F.2d 1354, 1357-58 (5th Cir. 1973) (questions on cross-examination designed to show bias of plaintiff’s expert properly excluded; “possibility of undue delay or waste of time” proper factors to consider); *United States v. DeMarco*, 488 F.2d 828, 831 n.8 (2d Cir. 1973) (repetition of points already covered).

69. Singer’s citation of *Donaldson v. California*, 404 U.S. 968 (1971), for the proposition that “without the program, neither Singer nor the Court could determine if the computer was deliberately programmed to generate error” (S. Br. 36), is misleading, for the case involved neither computer programs nor evidentiary questions. Rather Justice Douglas, dissenting from a denial of *certiorari* in a criminal case where the jury selection process was claimed to exclude Blacks and Chicanos, argued only that the use of computer technology in jury selection should facilitate the selection of a racially representative sample.

the program is necessary to determine "whether all, or indeed any, of the data and formulas identified by Perma as input were in fact used by the computer in creating the output" (S. Br. 36)—in other words, whether DeVilliers was lying about what went into the program and why.

Singer, however, could easily have tested DeVilliers' credibility in this respect on the basis of evidence already in its possession, and cannot now be heard to complain of its election not to do so. All of the formulas and numerical constants comprising the computer input were in evidence (PX 132, 133, 133A, 134, 135, 143; Tr. 2964-70, 2984-88, 3926-27) as well as in standard university textbooks (Tr. 2967),⁷⁰ and the Runge-Kutta fourth order method of numerical integration was also "standard" (Tr. 2906). Singer accordingly had ample opportunity to reproduce the computer simulation. Indeed, Singer instructed its expert, Rabins, to do precisely that, but later told him to "cease and desist" (Tr. 7932). Rabins was retained on April 19 (Tr. 7932), during the three-week recess that interrupted DeVilliers' cross-examination (Tr. 3091, 3712), and at that time was asked to simulate the Perma device

70. Singer's claim on appeal that not all of the input data was furnished (S. Br. 39-40) is directly contradicted by the very portions of the record it cites. While DeVilliers did indeed testify that intermediate calculations were performed using the formulas and numerical constants reflected in PX 134 and 135 to obtain the specific numbers fed into the computer program (Tr. 3014, cited in S. Br. 39), that testimony makes clear what those steps were:

"One has to do some calculations with the numbers on Exhibit 135 *and use the drawings* to actually produce the weights which go into ultimately producing that number.

* * *

"... Well, to get the weight of something, *if one knows its density, one would take its dimensions off a drawing*, compute the volume times the density is equal to the weight, and *this is the way these numbers were used*. Although the cam gear threshold shows up directly there, for instance."

Tr. 3014, emphasis added. The drawings were of course in evidence (PX 23, 142) and the mysterious "different set of numbers" alluded to by Singer (S. Br. 39) represents nothing more than information obtained therefrom.

(Tr. 7915-16, 7932). When DeVilliers' cross-examination resumed on April 25, Singer examined for almost the entire day on the extent to which various specific factors were taken into account in the simulation (Tr. 3710-3834), after which the cross-examination was interrupted for another week (Tr. 3834a-3836). On May 1, defense counsel questioned DeVilliers for another 16 pages about factors whose inclusion in or omission from the simulation were claimed to affect its validity (Tr. 3846), and on the same day instructed its own expert to stop work on his simulation (Tr. 7932), giving rise to the inescapable inference that his results would have done nothing to contradict those of DeVilliers. The trial did not conclude until June 28, 1974 (Tr. 8090). "[D]efense counsel thus had ample opportunity to check the computer's performance, or, for that matter, to renew their demand for production of the program,"⁷¹ during the twelve weeks between the conclusion of DeVilliers' direct examination on April 4 and the end of the trial on June 28. Having failed to take advantage of that opportunity, Singer cannot now be heard to complain that its own inaction entitles it to another bite of the apple.⁷²

71. *United States v. Dioguardi*, *supra*, 428 F.2d at 1039. In that case, since the program was obviously a simple one, the Court found it sufficient that the trial lasted another ten days after the testimony of the witness through whom the results of the computer's calculations were offered.

72. Singer's argument, under a separate sub-heading, that "the results cannot be verified" without the program (S. Br. 38), seems to be no more than a variation on the theme that the program might have suggested new avenues for cross-examination of DeVilliers; certainly Singer does not argue that it was prejudiced in any other way. The results could, of course, have been "verified" by duplicating the stimulation. Cf. *United States v. Dioguardi*, *supra*, 428 F.2d at 1038-39. Singer's citation of this case and *D & H Auto Parts, Inc. v. Ford Marketing Corp.*, 57 F.R.D. 548 (E.D.N.Y. 1973), for the proposition that "computer-generated evidence" which cannot be readily "verified" by the opposing party is inadmissible (S. Br. 39) is astonishing, since both cases stand for precisely the converse proposition: computer evidence was held properly admitted where, as here, the adverse party was capable of duplicating it. Singer's reliance on *Reeves Instr. Corp. v. Beckman Instruments, Inc.*, 444 F.2d 263 (9th Cir.), *cert. denied*, 404 U.S. 951 (1971) (S. Br. 38), is

Singer has thus utterly failed to show that nonproduction of the computer program cut off any lines of cross-examination which were not already open to it, and which, for its own reasons, it chose not to pursue, or that it was thereby prejudiced in any other way whatsoever. Production, however, would have endangered the authors' proprietary rights in the program (Tr. 3088). Limitation of cross-examination where trade secrets would otherwise have to be disclosed has been recognized in this Circuit, *Segal Lock & Hardware Co. v. FTC*, 143 F.2d 935 (2d Cir. 1944) (Swan, J.), *cert. denied*, 323 U.S. 791 (1945). Singer has never challenged the proprietary character of the program here, except to quibble over who was entitled to the proprietary protection (Tr. 4178), and on appeal relies on three authorities which acknowledge the special problems presented, in the evidentiary context, by the proprietary nature of computer software.⁷³ Roberts proposes protective orders as a solution,⁷⁴ while the Subcommittee on Agency Ratemaking takes the broader view that "a proponent of a machine study should have both a right and a duty to observe any restrictions on disclosure" imposed by law.⁷⁵ That is all Perma did here in declining to disclose the proprietary software of its experts, and although plaintiff stated its willingness to consent to an appropriate protective order if the need for the program on cross-examination were shown (Tr. 3088) defendant did not thereafter press for its production, or propose such an order.

mystifying, since the case was a patent infringement action involving a device for checking computer operation in which no evidentiary question was involved and the Court had no occasion to consider evidentiary standards for checking the results of computer operation. The sentence quoted by Singer is taken out of context from a background discussion of how computers operate.

73. Roberts, *op. cit. supra*, note 64; *Machine-Prepared Studies*, *ibid.*; Note, 40 BROOKLYN L. REV. 116 (1973) (S. Br. 35).

74. 41 U. CHI. L. REV. 269, note 44.

75. *Machine-Prepared Studies*, at 2.

If, then, the trial court's ruling that the program was not required to be produced operated to limit cross-examination at all, any such limitation was well within its sound discretion. *Segal Lock & Hardware Co. v. FTC*, 143 F.2d 935, 937 (2d Cir. 1944), *cert. denied*, 323 U.S. 791 (1945); *cf. United States v. DeMarco*, 488 F.2d 828 (2d Cir. 1973); *United States v. Mahler*, 363 F.2d 673, 677 (2d Cir. 1966); *see also United States v. Compania Cubana de Aviacion S.A.*, 224 F.2d 811, 822 (5th Cir. 1955).

2. Expert Opinion May Be Based on Hearsay.

Midway in its argument that the production of the program should be an inflexible prerequisite to the admissibility of all "computer-generated" evidence, Singer states that "computer-generated evidence will inevitably be hearsay" (S. Br. 37), citing a number of authorities which, without exception, deal with the situation in which computer-stored data is offered for the truth of the matter stated.⁷⁶ In an effort to exclude the printouts on this ground, Singer resorts to the extraordinary reasoning that the "printouts are statements made by an out-of-court declarant, *the computer program*" (S. Br. 37, *emphasis added*). This is a typical example of Singer's Catch-22 logic,

76. In *Ed Guth Realty, Inc. v. Gingold*, 34 N.Y.2d 440, 451-52, 315 N.E.2d 441, 445-46, 358 N.Y.S.2d 367, 373-74 (1974), computer printouts reflecting the state equalization rate applicable to assessments on real property were admitted in a proceeding by a taxpayer for relief against an assessment under the business records exception to establish the ratio of assessed value to fair market value. The Court of Appeals' summary of the foundation testimony which it considered adequate to satisfy the requirements of the business records rule is significantly lacking in any mention of the computer program. In *McGill v. Jenkins* (Civ. Ct. N.Y. Co. June 13, 1975), 173 N.Y.L.J. No. 114, at 16 (dictum), a computer printout of building violations found by the Housing and Development Administration's Model Cities Program was offered in support of a tenant's claim against her landlord for breach of warranty of habitability. Younger, *Computers and the Law of Evidence*, 173 N.Y.L.J. No. 3 at 1 (Feb. 25, 1975), deals with various possible objections to admissibility of a computer printout in a hypothetical situation in which it is expressly assumed that the printout is "being offered to prove the truth of the matter asserted in it," p. 1, col. 2. The other non-judicial authorities cited by Singer for this proposition are distinguished in note 67, *supra*.

for a *program* is not of course a person subject to cross-examination, and its production could never cure any objection based on hearsay. When practical reality is substituted for artificial reasoning, however, it is clear that the extra-judicial declarant is the human *programmer*, not the inanimate program created by his mental processes, and his presence in court for cross-examination should overcome the hearsay problem, even where the computer printouts are offered for the truth of the matter stated.⁷⁷ Singer's extensive cross-examination of DeVilliers accordingly vitiated any hearsay objection that might have been available if he had not been called.

In fact, however, no hearsay objection was available here because the printouts and summaries were offered, not to prove the truth of the matter stated, but as the bases for the opinion of plaintiff's expert (Tr. 2462-63). It has long been the rule in the federal courts that "an expert may testify as to hearsay matters, not to establish substantive facts, but for the sole purpose of giving information upon which the witness relied in reaching his conclusion," *United States v. Sowards*, 339 F.2d 401, 402 (10th Cir. 1964), quoting with approval *United States v. Featherston*, 325 F.2d 539, 542-43 (10th Cir. 1963); accord, *Reid v. Quebec Paper Sales & Transp. Co.*, 340 F.2d 34, 38 (2d Cir. 1965); see also *Weymouth v. Colorado Interstate Gas Co.*, 367 F.2d 84, 91 (5th Cir. 1966). Federal Rule of Evidence 703 now carries this liberal standard of admissibility one step further, providing that the

"facts or data in the particular case upon which an expert bases an opinion or inference[,] . . . [i]f of a type reasonably relied upon by experts in the particular field in forming opinions or inferences upon the subject, . . . need not be admissible in evidence."

77. Federal Rule of Evidence 801(d)(1) is not to the contrary, since, as the Advisory Committee Note to the Rules as adopted by the Supreme Court makes clear, it deals only with *inconsistent* statements which are hearsay because they have not been adopted by the witness. "If the witness admits on the stand that he made the statement and that it was true, he adopts the statement and there is no hearsay problem." Advisory Committee Note, 56 F.R.D. 183, 295 (1973).

The evidence here involved is clearly "of a type reasonably relied upon by experts" in these circumstances. The use of computer simulations in product development, including a comparison of many different combinations of variables in a search for optimal design, was testified to by Singer's own expert witness (Tr. 7917) as well as by DeVilliers (Tr. 3812; *see also* 2894, 2904-07), and is supported by the only authority cited in defendant's brief which deals with simulations, Note, 24 STAN.L.REV. 712, 713 (1972) (S. Br. 32).

The admission of the computer printouts and summaries thereof as the bases of plaintiff's expert opinion testimony was thus a proper exercise of the trial court's discretion, *even if* they were in fact hearsay. Since, however, DeVilliers, who was the author of both the problems the computer was instructed to solve and the program by which it did so, was called as a witness and cross-examined, none of this evidence was hearsay in any event, and Singer's desire to cross-examine the program (S. Br. 37) is a conceptual absurdity having no bearing on admissibility.

3. The "Reliability" of the Simulation Is a Question of Weight, Not Admissibility.

Singer next cites two examples of data from the computer printouts which it interprets as reflecting "physically impossible" performance by the Perma device (S. Br. 40-41). This argument is based exclusively on the direct testimony of its witness Rabins (Tr. 7984-90), whose laborious efforts to impute a variety of "errors" to the DeVilliers simulations were thoroughly demolished on cross-examination (Tr. 8018-29; 8031-36; 8048-53). Indeed, Rabins' criticisms of the "green" entries on which Singer relies on appeal (Tr. 7990-92, S. Br. 40) are apparently contradicted in his own published work (Tr. 8018-20).⁷⁸

78. This book was relied on in part to establish Rabins' expertise (Tr. 7858, 7886-88). Rabins' direct testimony, even if taken at face value, is not nearly so categorical as the paraphrase in Singer's brief. Although Singer pontificates that:

In such circumstances the trial court was entitled completely to disregard Rabins' testimony about the purported significance of the "green" and "yellow" entries, *Sweeney v. American S.S. Co.*, 491 F.2d 1085, 1089-90 (6th Cir. 1974) (rejection of scientific evidence that plaintiff's decedent was drunk *held*, within sound discretion of trial judge); *United States v. Compania Cubana de Aviacion S.A.*, 224 F.2d 811, 820 (5th Cir. 1955) (failure to give credence to counter testimony of defendant's witnesses not reversible error). Moreover, even if the trial court believed Rabins' testimony on this point, the claimed "errors" in the simulations affect only the weight of the evidence, not its admissibility. This has long been the rule with respect to the issue of the reliability of expert evidence generally, *United States v. Kelly*, 420 F.2d 26, 28 (2d Cir. 1969) (S. Br. 45); more recently, the principle has been applied in two cases on which Singer

"Newton's Second Law of Motion tells us that an object continuously subjected to acceleration must continuously increase its velocity and that an object continuously subjected to deceleration must continuously decrease its velocity"

(S. Br. 40), its expert was more cautious about the application of these grandiose principles to the Perma simulations:

"Q Is it physically possible, Professor Rabins, for a wheel which is decelerating to be increasing in wheel speed and, conversely, for a wheel which is accelerating to be decreasing in speed during a period of constant acceleration or deceleration?"

"A Well, first of all, I don't know that this is constant acceleration. All we know is the printout data we have here. We don't know what is happening in between these printout lines.

"Second of all, if I look at a very, very simple portion of what is happening here, if you think of just a rotating disc, a tire, and I apply torques on that disc so that there is an acceleration being felt by that disc, you would expect the disc to be speeding up while it is accelerating, and while I put braking torques on the disc to slow it down, to put decelerations on it, while it is decelerating, you would expect it to slow down. That is not happening in those yellow periods."

Tr. 7986. Elsewhere, Rabins conceded that the pattern reflected in these entries

"doesn't happen everywhere in the record. It happens here. It is an anomaly [*sic*] that we have trouble understanding from the model."

Tr. 7985.

relies for standards of admissibility of computer-generated evidence, *United States v. Russo*, 480 F.2d 1228, 1243 (6th Cir. 1973), *cert. denied*, 414 U.S. 1157 (1974) (S. Br. 35); *D & H Auto Parts, Inc. v. Ford Marketing Corp.*, 57 F.R.D. 548, 551 (E.D.N.Y. 1973) (S. Br. 39). Where, as here, a jury has been waived, the trial court's findings are conclusive and determination of the weight of the evidence is outside the scope of appellate review, *McCaughn v. Real Estate Land Title & Trust Co.*, 297 U.S. 606 (1936); *accord: United States v. Compania Cubana de Aviacion S.A.*, 224 F.2d 811, 820 (5th Cir. 1955); *Sweeney v. American S.S. Co.*, 491 F.2d 1085, 1089-90 (6th Cir. 1974).

4. There Was Adequate Evidentiary Foundation for All of the Challenged Evidence.

Persisting in its notion that the simulations were a test or experiment designed to establish the empirical performance characteristics of a particular piece of hardware, Singer next argues that admissibility required a showing that the "device as simulated was the same as the Perma device and that the simulated conditions were substantially similar to conditions existing during early 1965" (S. Br. 41). Three cases are cited in support of the quoted proposition, all of which involve post-accident experiments offered on the issue of what caused an accident in which the plaintiff was injured.⁷⁹ Even in this clearly distinguishable context, the cardinal principle is "the discretion of the trial judge . . . [whose] decision must not be overturned on ap-

79. *Glick v. White Motor Co.*, 458 F.2d 1287, 1294-95 (3d Cir. 1972) (issue whether broken spring eye in truck was cause or effect of highway collision; exclusion of evidence of experiment on another spring eye offered to show cause of break *held*, within trial court's discretion); *La France v. New York, N.H. & H.R.R.*, 292 F.2d 649, 650 (2d Cir. 1961) (issue whether accident arising out of malfunctioning switch could have happened in the manner plaintiff claimed; exclusion of evidence of tests on other switches, *held*, not an abuse of discretion); *Lobel v. American Airlines, Inc.*, 205 F.2d 927, 931 (2d Cir. 1953) (issue whether plane crash caused by negligent maintenance; experiments showing effect of piece of paper in fuel line poppet valve *held*, properly admitted despite absence of showing of "perfect identity" of conditions).

peal absent a clear showing of an abuse of discretion," *Glick v. White Motor Co.*, 458 F.2d 1287, 1295 (3d Cir. 1972).

There is no such showing here. On the contrary, the "three mathematical models" representing the Perma device, the vehicle and the friction characteristics of the road (S. Br. 41) each satisfied the conditions of substantial similarity.

The Perma model. The Perma device used in actual road tests had a gear ratio of 12 to 1 (see PX 130 and 134). The first of the simulations (PX 128; Tr. 2992) modelled a device with a 12 to 1 gear ratio; if DeVilliers had stopped there, there would be no issue to discuss. However, since Goor's purpose in commissioning simulations in the first place was to assist him in evaluating the marketability of the device, he also considered the question whether variations in gear ratio would be likely to produce improved performance. Additional simulations were accordingly run assuming gear ratios, respectively, of 24 to 1 and 18 to 1 (Tr. 2611, 2992; PX 127, 129). These are hardly "unspecified engineering changes" (S. Br. 42); they are clearly set forth in the record, and they have nothing in common with the kind of conjecture which has been held an improper basis for expert opinion in the long string of irrelevant cases cited by Singer (S. Br. 42).⁸⁰

80. The first three cases cited (S. Br. 42) were condemnation proceedings in which claimants were held to have failed to make a sufficient evidentiary showing of the "highest and best use" of the land for which compensation was sought, *City of New York v. Broadway Cary Corp.*, 34 N.Y.2d 535, 309 N.E.2d 870, 354 N.Y.S.2d 100 (1974) (rejection of claimant's argument that land could have been used as a shopping center held proper where no showing of economic feasibility); *Sparkill Realty Corp. v. State*, 268 N.Y. 192, 197 N.E. 192 (1935) (award for quarry based on hypothesized profit factors over a projected 25-year period reversed where no showing that property could have been operated for that length of time and "hypothesized profit factors had no reality"); *In re Shorefront High School*, 25 N.Y.2d 146, 250 N.E.2d 333, 303 N.Y.S.2d 47 (1969) (award based on finding that highest and best use was as Mitchell-Lama housing project reversed, where no showing of "reasonable probability that such a subsidy would have been granted in this case"). *Dipson Realty Co. v. State*, 39 App. Div. 2d 636, 331 N.Y.S.2d 186 (4th Dep't 1972) (S. Br. 42), another condemnation case, approved by way of

The vehicle model. Singer next argues that DeVilliers' use of mathematical equations modelling a vehicle "dynamically similar to a 1968 [Ford] Thunderbird" (Tr. 2983) should exclude the simulations because "*the record reflects significant differences in braking performance between 1968 Thunderbirds and 1965 era automobiles*" (S. Br. 43, emphasis added). Significantly, however, this bold statement is unadorned by any record reference whatever—and understandably so, for all of the evidence in the record on this point is precisely to the contrary. Goor testified that the Kelsey-Hayes system, modelled on a "typical vehicle" which was "based essentially on a 1967 or '68 vintage Thunderbird" (Tr. 2456, 2470-71), had "function[ed] essentially in the same manner" on a wide variety

dictum the Court of Claims' rejection of cost appraisals of claimant's expert, who based his valuation "not on the cost of improvements on the property but on the cost of improvements that he thought should be there." *Cassano v. Hagstrom*, 5 N.Y.2d 643, 155 N.E.2d 348, 187 N.Y.S.2d 1 (1959) (expert testimony that cutting of certain nerves was contrary to professional dental practice properly excluded where there was no evidence that defendant dentist had in fact cut the nerves) (S. Br. 42) and *Cooke v. Bernstein*, 45 App. Div. 2d 497, 359 N.Y.S.2d 793 (1st Dep't 1974) (error to admit expert testimony attributing cause of explosion to "Con Edison gas" where other defendants had settled and there was no evidence that defendant Con Edison's gas was present at site of explosion) (S. Br. 43) both stand for the black-letter proposition that expert opinion must be predicated on facts in evidence, which Goor's opinion in this case of course was, whether or not that proposition is still the law, compare FED. R. EVID. 703, 705. The remaining three cases (S. Br. 43) all deal with expert testimony as to the cause of a past physical occurrence based on a different physical object from the one involved in the accident, *D'Amico v. Lloyd Brasileiro Patrimonial Nacional*, 354 F.2d 33 (2d Cir. 1965) (expert opinion as to cause of breaking rope inadmissible where based solely on a photograph not sufficiently identified as the rope involved in the accident); *Stracher v. Corning Glass Works*, 39 App. Div. 2d 560, 331 N.Y.S.2d 764 (2d Dep't 1972) (error to admit expert opinion as to cause of flask cleaving where flask examined by expert not shown to be of same composition); *Graham v. Board of Education*, 19 App. Div. 2d 635, 241 N.Y.S.2d 71 (2d Dep't 1963) (error to receive expert opinion that ladder was defective where examination occurred 2½ years after accident and no basis for inference that defect had existed at time of accident).

of cars, including 1964 and 1965 models (Tr. 2655; *see also* 2644). Singer never rebutted this evidence.⁸¹

The friction model. Singer next complains that the friction model "was based upon" certain scientific data published in 1968, "more than three years after the relevant period" (S. Br. 44). Since Singer cannot be suggesting that the laws of physics relating to friction characteristics of road surfaces changed between 1965 and 1968, the argument is apparently that DeVilliers' simulations incorporated new scientific information which would not have been available to Singer if it had in fact used its best efforts to perfect and market the product in 1965. The basic formulas comprising the friction model (PX 143; Tr. 3930) had been used by DeVilliers in simulating the Kelsey-Hayes device (Tr. 2929-30), which he did in 1966 (Tr. 2979). Singer points to no way in which the more sophisticated understanding of some aspects of tire-road friction reflected in PX 136 is claimed to have materially affected the results of DeVilliers' simulations.

In summary, Singer's efforts to differentiate DeVilliers' simulations from the Perma device are contradicted by the

81. Singer's brief cites the testimony of its witness MacDuff (elsewhere identified by Singer as "a mechanical engineer . . . who has no computer experience whatsoever" (Tr. 4180)) for the proposition that "split ratio brake proportioning valves" on 1968 Thunderbirds "radically improved simulated performance of the Perma device over that which could have been obtained on a 1965 automobile" (S. Br. 43-44, citing Tr. 6955-81). MacDuff, however, did not so testify. The simulation assumed a fixed ratio proportioning valve (Tr. 6954-55) and MacDuff testified that its absence need *not* affect performance (Tr. 6955). The rest of the portion of his testimony cited by Singer deals with computations MacDuff made based on "modifications of the data involved in the simulation in order to convert the vehicle from a lightly loaded vehicle to a heavily loaded vehicle" (Tr. 6966). None of this evidence rebuts—or is even relevant to—Goor's testimony to the effect that there was no significant difference in performance results on a 1968 Thunderbird and earlier-model cars. On voir dire, MacDuff was unable to account for errors in the formula by which these computations were made (Tr. 6966-67) and admitted that the calculations he was describing did not result in the curve he had plotted (Tr. 6974). The trial court found MacDuff's testimony in general less credible than that of plaintiff's experts (Op. 43), a finding peculiarly within the province of the trier of the fact, *see cases cited in note 61, supra*.

record: DeVilliers' testimony establishes the fidelity of the simulation to the material characteristics of the device simulated. Reception of the computer printouts would therefore have been a proper exercise of the trial court's discretion even if they had been offered substantively, *Lobel v. American Airlines, Inc.*, 205 F.2d 927, 931 (2d Cir. 1953). This evidence, however, was not offered substantively, but solely as one of the bases for the opinion of plaintiff's expert that the Perma device was marketable (Tr. 2461-65). In such circumstances the trial court has even broader discretion, *see generally Weymouth v. Colorado Interstate Gas Co.*, 367 F.2d 84, 91 (5th Cir. 1966); *Hopkins v. E. I. duPont DeNemours & Co.*, 199 F.2d 930, 934 (3d Cir. 1952) (dictum); *cf. United States v. 421.89 Acres of Land*, 465 F.2d 336 (8th Cir. 1972) (expert opinion on "comparable" value admissible in condemnation proceedings despite dissimilarities in properties compared). Moreover, the question whether the data considered by the expert is indeed comparable to the subject of the litigation is itself a question of fact, *Weymouth v. Colorado Interstate Gas Co.*, *supra*, at 92-93; *Morris v. State*, 41 App. Div. 2d 864, 342 N.Y.S.2d 615 (3d Dep't 1973); dissimilarities affect only the weight, not the admissibility, of the expert opinion, *United States v. 45,131.44 Acres of Land*, 483 F.2d 569, 571 (10th Cir. 1973); *Weymouth v. Colorado Interstate Gas Co.*, *supra*, and are therefore outside the scope of appellate review, *McCaughn v. Real Estate Land Title & Trust Co.*, 297 U.S. 606 (1936); *accord, United States v. Compania Cubana de Aviacion S.A.*, 224 F.2d 811, 820 (5th Cir. 1955); *Sweeney v. American S.S. Co.*, 491 F.2d 1084, 1089-90 (6th Cir. 1974).

5. Singer Had Ample Notice of the Bases of Plaintiff's Expert Testimony.

Singer's claim that it "first learned" of the computer simulations during Goor's direct examination on January 4, 1974 (S. Br. 32, 41) is simply false. Ct. X 1, dated November 30, 1973, advised defendant that Goor's expert testi-

mony would be based in part on the simulations; see Tr. 3886, 3892-93. Singer at trial argued that this letter was "untimely" (Tr. 3892) and several days later added that it was not in "prescribed form" (Tr. 4176); but on appeal has substituted for these arguments the pretense that the letter does not exist.

Singer has never explained its failure to raise this issue between November (9) and May 1, when it moved to strike the exhibits reflecting inputs and printouts (Tr. 3880-83). Singer's initial request, during Goor's testimony, did not go beyond printouts and inputs (see, e.g., Tr. 2508-09).⁸² Singer's first request for the program was not made until April 4, 1974 (Tr. 3086), more than five months after Perma first informed Singer that Goor's opinion testimony would be based in part on computer simulations (Ct. X 1). The argument that Singer should have had "notice" *before* the simulations were performed in order to "participate" therein was not advanced until May 1 (Tr. 3880-83, 3886, 3892-93).

The most serious misrepresentation in Singer's "notice" argument is, however, the statement that "Singer was prejudiced by Judge Duffy's countenance [*sic*] of such trial tactics and his denial of Singer's request for a continuance to perform and offer computer simulations of its own (Tr. 5868-69)" (S. Br. 45). Singer never requested a continuance, although it in fact enjoyed the benefit of one, and had *already abandoned* the decision "to perform and offer computer simulations of its own" before the colloquy Singer cites in support of this statement.

DeVilliers' direct examination was completed on April 4, 1974 (Tr. 3066). Although cross-examination began on the same day (Tr. 3067-3091), it was immediately inter-

82. The record references cited by Singer on this point as "reiterations" of such requests (S. Br. 33), consist of such things as petulant complaints about the legibility of material already delivered (Tr. 2969-70) and counsel's vague conjecture that "it would seem to me there should be additional backup" (Tr. 2972) in addition to that which had been disclosed.

rupted for three full weeks, until April 25.⁸³ On April 19, Singer retained Rabins, who started work on "building a computer simulation of this device" (Tr. 7932). DeVilliers' cross-examination resumed on April 25 (Tr. 3712), and was then interrupted for another week (Tr. 3835-36), resuming—and concluding—on May 1, 1974 (Tr. 3836-3880). On that day, defendant made its motion to strike (Tr. 3880) and instructed its expert to "cease and desist" further work on an independent simulation (Tr. 7932). Thirty days *later*, in the colloquy cited in Singer's brief as its alleged "request for a continuance," counsel stated that the court's "denial of the motion to strike at this time may require us to ask for some further delay since we may well have to now go forward with an expert witness to meet the testimony which plaintiff has offered." (Tr. 5868, May 31, 1974). Rabins testified on June 26, 1974, as the very last witness in the eight-month trial (Tr. 7847, 8086). The suggestion that further delay might be sought was not pursued, no motion was ever made, and defendant's only subsequent references to the computer simulations are those which appear in Rabins' testimony:

Thus, after using the two interruptions in DeVilliers' cross-examination precisely for the purpose of preparing its own expert, Singer did indeed "go forward with an expert witness" in its effort "to meet the testimony" of Goor and DeVilliers. It elected to do so by eliciting testimony with respect only to DeVilliers' simulations, rather than by offering its own, but this was clearly a deliberate strategy decision, and the inference is inescapable that Rabins was told to "cease and desist" because his results would have corroborated DeVilliers' testimony. There was no prejudice in the trial court's failure to grant a further continuance for which Singer never moved to permit it to fish for error in ways that can scarcely be guessed at.

The facts, then, disprove Singer's extravagant claim of "trial by ambush." The cases on which it relies are equally

83. Court was in recess until April 15 (Tr. 3091) and another witness was then interpolated (Tr. 3105).

misplaced. *United States v. Dioguardi* and *United States v. Russo* (S. Br. 45) are distinguished above, pp. 65-66. The only other cases cited relate to "tests and experiments."⁸⁴ The irrelevance of this line of cases where, as here, the trier of fact is not required to determine the nature or cause of past events, has already been pointed out, see text at note 79, *supra*.⁸⁵

The record here clearly shows what Singer knew about plaintiff's computer simulations and when Singer knew it. There was ample opportunity to rebut this evidence and

84. *Fortunato v. Ford Motor Co.*, 464 F.2d 962, 966 (2d Cir.), cert. denied, 409 U.S. 1038 (1972); *Weaver v. Ford Motor Co.*, 382 F.Supp. 1068 (E.D. Pa. 1974), aff'd without opinion, 515 F.2d 506 (3d Cir. 1975); *Balian v. General Motors*, 121 N.J. Super. 118, 130-31, 296 A.2d 317, 323-24 (App. Div. 1972) (S. Br. 45). Each of these cases was an action against an automobile manufacturer in which defendant's experts staged tests on similar vehicles designed to show that plaintiff's theory of how the accident happened was physically impossible. In *Balian*, the problems inherent in this type of evidence were exacerbated by the fact that the jury was shown a film of the "experiment," shot over a weekend without notice to plaintiff, after an earlier version had been ruled inadmissible. *United States v. Kelly*, 420 F.2d 26, 29 (2d Cir. 1969), cited by Singer on this same point, was a criminal case in which defendants, despite litigated pre-trial discovery motions, had no advance notice whatever of the Government's intent to offer evidence of a scientific test, impossible to duplicate during trial, designed to show that narcotics had come from a single batch.

Strangely, defendant was silent on the principles of notice and opportunity to participate when it offered MacDuff's testimony about his trip to the Bendix proving grounds to drive cars equipped with GM, Ford and Chrysler anti-skid devices in an attempt to "fool the unit" (Tr. 6339-42), although that is precisely the kind of situation in which notice and opportunity would be required if the results of the "experiments" were relevant to any material issue of fact.

85. At trial, Singer also argued that it was entitled to "participation" in, as well as notice of, the simulations (Tr. 3881). Since the only use of the computer here was as "a big calculator" (Tr. 2906) to solve the equations involved, Singer could have "participated" only by being physically present when the data processing equipment was in operation, or by participating in DeVilliers' mental processes. This argument is apparently not pressed on appeal.

Singer's claim of lack of notice is nothing more than a repetition of its own rhetoric, totally unconnected with what actually happened in this case.

In summary, then, it is clear that the trial court correctly applied the rules of evidence applicable to the bases of expert opinion testimony, and that there was no prejudice to Singer in the reception for this purpose of the computer printouts and exhibits reflecting the inputs. Moreover, since the record clearly establishes that these documents were only part of the basis for Goor's opinion, as set forth above, p. 61, a ruling that the trial court erred in receiving them would not in any event affect the admissibility of Goor's testimony that the Perma device was marketable.⁸⁶ The trial court's finding that this testimony was more credible than the contrary opinion of defendant's experts accordingly involved no reversible error; the device was perfectible and Singer's failure to use its best efforts to perfect and market it was an actionable breach for which damages were properly awarded.

86. Neither *J. Gerber & Co. v. S.S. Sabine Howaldt*, 437 F.2d 580, 593-94 (2d Cir. 1971) nor *Syracuse Broadcasting Corp. v. Newhouse*, 319 F.2d 683, 688 (2d Cir. 1963) (S. Br. 45) supports a contrary result. In *Gerber*, expert opinion testimony was held incompetent where elicited in response to "misleading and unfair" hypothetical questions which assumed plaintiff's version of the facts and omitted other relevant facts. In *Syracuse Broadcasting*, an expert's testimony that the effect of a unit rate for advertising purchased from a newspaper and affiliated radio stations would be to deplete the budgets of national advertisers was disallowed as speculation. No question of the admissibility of the bases of the expert's opinion was raised in either case. Compare FED. R. EVID. 703.

III

The Award of Damages Should Be Affirmed.

Singer attacks the District Court's award of damages on three grounds. First, it argues that, despite its clear and unmitigated breach of the contract, no damages at all should have been awarded, on the theory that no market existed for what it persists in calling the "redesigned" device (S. Br. 47-51). Alternatively, Singer complains of the amount of damages awarded, attacking the reasonableness of its own projections (S. Br. 51-59), and finally, it argues that the projections were "misapplied" by the court below, quibbling over such details as whether the unit price on which royalties were computed (PX 60A) did or did not include excise tax.⁸⁷

All of Singer's arguments on damages are based on the same theory as its arguments on liability—that the Perma device was unmarketable and that it had to be "redesigned"—issues of fact which the trial court resolved against Singer on the basis of the substantial evidence discussed above, Point I. Since these arguments are, in addition, permeated by a basic confusion between the kind of evidentiary showing required to establish the *fact* of damage on the one hand and the measure of damages on the other, we discuss first the legal standards as to fact of damage, which were correctly applied by the court below (Point A). The evidence supporting the court's finding that Perma was damaged is discussed in Point B and the correctness of the amount awarded in Point C.

A. Singer, Having Sat Idly on the Perma Patents, Must Bear the Burden of Any Resulting Uncertainty as to the Precise Amount of Perma's Lost Royalties.

There is nothing unique in Singer's argument that no damages at all should be awarded in this case because the

⁸⁷ Singer does not, of course, complain of the court's failure to include a factor for inflation (Op. 57) during the eight years of litigation, which included the years in which inflation was in the "double digit" category.

7
volume of sales in particular segments of the market for a new product is uncertain (S. Br. 51-55). It is the classic but judicially rejected refrain of the wrongdoer attempting to exploit the uncertainties created by its own breach as a device for avoiding liability, see *Bigelow v. RKO Radio Pictures, Inc.*, 327 U.S. 251, 264-65 (1946). Judge Duffy's view of that argument is in accord with the consistent refusal of other judges, in cases strikingly similar to this one, to reward the party guilty of a serious breach of contract by acceptance of a theory so convenient to the wrongdoer.

Judge Weinfeld in *For Children, Inc. v. Graphics International, Inc.*, 352 F. Supp. 1280 (S.D.N.Y. 1972) set a clear guideline for the damage award in this case. In that case, a publisher sued a printer for breach of a contract to produce a line of children's three-dimensional pop-up books to be sold through mass distribution techniques in mass retail outlets such as supermarkets, chain stores and discount houses. The venture represented plaintiff's first attempt to enter the children's book market through such retail distribution techniques, and because the field was so limited, defendant's breach prevented plaintiff from marketing the product at all. The court found, however, that "[t]he contemplation of the parties was that the entire order would be sold to the public," 352 F.Supp. at 1284, and awarded damages for lost profits consistent with what the parties themselves contemplated before litigation arose. That is precisely what the trial court did here.

Perma, whose damages resulted from Singer's failure to market Perma's product after acquiring all of its patents and all of the manufacturing and marketing rights to the device, is here in a position analogous to that of the plaintiff in an antitrust action seeking to recover for injuries sustained as a result of exclusion from a market. In *Zenith Radio Corp. v. Hazeltine Research, Inc.*, 395 U.S. 100 (1969), defendants' activities had prevented plaintiff from selling its radio and television products in the Canadian market. The District Court's finding that plain-

tiff suffered injury to its business during the period in question had been set aside by the Court of Appeals for the Seventh Circuit on the ground that Zenith had not shown it would have done any more business in Canada in the absence of the defendant's "patent pool," 395 U.S. at 114-118. The Supreme Court reversed. Noting that in market-exclusion cases "damage issues . . . are rarely susceptible of the kind of concrete, detailed proof of injury which is available in other contexts," 395 U.S. at 123, the Court held that circumstantial proof of injury was sufficient to support the District Court's fact-of-damage finding, 395 U.S. at 124-25, and quoted with approval Chief Justice Stone's observation in *Bigelow v. RKO Radio Pictures, supra*, that

"Any other rule would enable the wrongdoer to profit by his wrongdoing at the expense of his victim. It would be an inducement to make wrongdoing so effective and complete in every case as to preclude any recovery, by rendering the measure of damages uncertain. Failure to apply it would mean that the more grievous the wrong done, the less likelihood there would be of a recovery."

395 U.S. at 124, quoting 327 U.S. at 264-65; *accord, Fontana Aviation, Inc. v. Beech Aircraft Corp.*, 432 F.2d 1080, 1086-87 (7th Cir. 1970), *cert. denied*, 401 U.S. 923 (1971); *see also Lehrman v. Gulf Oil Corp.*, 464 F.2d 26, 46 (5th Cir.), *cert. denied*, 409 U.S. 1077 (1972) (analogy between anti-trust damages and "contractual expectations" cases recognized).

In the *Fontana* case, the fact of damage depended on whether plaintiff had lost sales as a result of the defendant manufacturer's cancellation of his dealership. The only evidence offered was the opinion testimony of plaintiff's 26-year-old chairman of the board, which the Court of Appeals characterized as "rather weak," as to the number of aircraft he would have sold in the absence of defendant's illegal conduct. This District Court set aside a jury verdict for plaintiff on the ground that the fact of damage was not proved. The Court of Appeals reversed, despite

its reservations as to the weight and credibility of plaintiff's evidence, noting that "the circumstances of plaintiff's business and the developing corporate airplane market did not present the usual situation," 432 F.2d at 1086. Nor do they here. It is not usual for a financially responsible defendant to take an assignment of patents with an obligation to manufacture and market the product, and then to sit idly on them without using its best efforts to ready the patented device for market.

Although the circumstances of Perma's business and the as-yet unexplored automotive anti-skid device market did not, in 1964, present "the usual situation," the evidence Perma adduced to show the existence of a market was much more substantial than that held sufficient to show fact of damage in *Fontana*.

B. The Fact of Perma's Damage Is Supported by Substantial Evidence.

Singer's contention that Perma was not damaged is based on the same arguments relied on to justify its breach, namely, that the device was not marketable and required "redesign" (S. Br. 47-51).

Singer's argument that no market existed for the Perma anti-skid device rests almost exclusively on the circumstance that, while Singer was sitting idly on the Perma patents, no *other* manufacturer sold a mechanical anti-skid device in the aftermarket (S. Br. 49). The inference that Singer would have the Court draw from this single fact is that no such market existed (*see id.* 50). The court below correctly declined to draw such an inference in the face of evidence showing that Singer's own conduct in 1964 was predicated on quite the opposite view.

Under the June contract, Singer was to manufacture the device but had no marketing rights (PX 35, §2 at 2). When Perma's deteriorating financial condition led the parties to discuss a new contract, Singer executives gave careful consideration to possible modifications of the existing contract which would not have required it to assume

any responsibility for marketing (*see* DX 191 at 5-8). It was decided, however, to seek marketing rights precisely because of the "additional potential profits accruing to Singer from them" (*id.* at 3; *see also id.* at 1, 2). At the time the December contract was entered into, then, Singer executives clearly recognized that a market for the device existed, and cannot now be heard to contend that their own subsequent, culpable failure to exploit that market somehow negated its existence.

There is additional evidence in the record establishing the existence of a market; for example: prior to the December contract Perma, through its own efforts, despite its limited resources and experience, had arranged aftermarket distribution contracts for the sale of some 139,000 units (PX 27, 28, 29, 30A, 30B, 31, 32) and had succeeded in interesting the Phillips Petroleum Company in the device as a possible item for sale in its nationwide chain of service stations (PX 25A). Within a month of the signing of the December contract, Singer negotiated exclusive distribution contracts for the United States and Canada (PX 34, 64), and Hough thought the marketing efforts of Singer's distributor, Monitor Enterprises, would be "more professional" than those of Perma (PX 59 at 5). Monitor, whose previous dealings with Perma (*see* PX 30A) gave it some familiarity with the potential of the Perma device, was sufficiently confident to agree to spend at least \$250,000 per year on promotion and advertisement of the device (PX 64, §2 at 2, 3) and to obligate itself to take a minimum of 50,000 units in the first year and 100,000 units as a condition of yearly renewal thereafter. Finally, the Hill Report, which Singer commissioned for the purpose of aiding its determination whether to enter into the December contract (PX 57 at 2), considered the aftermarket an opportunity for significant sales volume (PX 57 at 3, 19) and concluded:

"The product, with its strong emotional appeal to safety, and with demonstrable characteristics, lends itself to a consumer-directed merchandizing effort. typical of products of this type, sales volume will

depend largely on the amount of promotional effort expended."

(*id.* at 3).

As of 1966, the date when the parties contemplated the Perma device would first be marketed (*see* pp. 19, 38 *supra*), it would have been the only anti-skid device on the market (Tr. 7003-04; Ct. X 6; *see also*, Op. 2, 55). The existence of patents, which Singer never relinquished,⁸⁸ may have discouraged the development of a mechanical anti-skid device by others both before and after the introduction of the first electronic anti-skid device in the 1969 model year. Perma would have enjoyed a complete monopoly until at least 1968, and a partial monopoly thereafter. The manufacturers of the electronic devices, as Singer correctly points out (S. Br. 50), did not attempt to penetrate the after-market, since their product, as distinguished from Perma's, may not have been well suited to installation outside the factory.

The market, then, certainly existed and Singer, in the days of its attempts to diversify product line, actively sought the chance to exploit the profit opportunity the Perma device presented. It now attempts to overcome this damaging evidence by arguing that the market it was so eager to enter in 1964 was a market for a different, "re-designed" device, with a "different cost and price" (S. Br. 47). Since the basic premise of this argument—that the device had to be "re-designed" to be marketable—has already been correctly rejected by the trial court, the argument must fail. Singer's argument, however, seems to be that any increase in the proposed selling price resulting from engineering changes would have eliminated the market for the device (S. Br. 49)—a market in which Perma had no competition. Singer, however, offered no evidence in support of this theory, and without such proof any such hypothetical increase is irrelevant to the fact of damage.⁸⁹

88. *See* note 35 at p. 30, *supra*.

89. Singer's hypothesis—which is only that, since it offered no evidence that engineering changes would have affected either cost or price in any event—is also irrelevant to the measure of damages, as discussed below, p. 101.

Singer's final effort to attack the finding that Perma was damaged by its breach is based on a strange inversion of a finding that was actually to its benefit. Since Singer's sales projections were not unambiguously limited to the aftermarket, the trial court, in determining the measure of damages, gave Singer the benefit of the assumption that some portion of those sales would have been in the "OEM" market, on which Perma was entitled to only half as great a royalty.⁹⁰ From this generous assumption as to the measure of damages, Singer reasons backwards that, in order to establish the fact of damage, Perma has the burden of proving precisely how many units could have been sold in the OEM market. As we have already seen, this is not the law.⁹¹ In addition, any uncertainties as to what portion of projected sales might have been allocable to different segments of the market go only to the amount of damages, not to the fact that Perma has suffered a compensable wrong. On this issue, as discussed below, if there was any error in the District Court's allocation of some of the projected sales to the OEM market, it was to Singer's benefit, since a lower royalty provision applied.⁹²

90. It was undisputed that the parties contemplated that sales in the first two years (commencing 1966) would be confined to the "aftermarket" (Op. 56; DX 191; PX 57), for which Perma was entitled to a royalty of 10% for the first five years and 5% thereafter (PX 60A, §3(c)(i)). The record was unclear whether the parties contemplated that all of the sales projected for 1968 and 1969 would also be in the aftermarket, or whether some portion thereof would be sales to original equipment manufacturers (the "OEM" market), for which the contract provided a royalty of only 5% for the entire ten-year term (PX 60A, §3(c)(ii)). Accordingly, the trial court resolved this ambiguity in favor of Singer, and computed damages for those two years on the assumption that half the sales would be made at the lower royalty rate, Op. 56.

91. *Bigelow v. RKO Radio Pictures, Inc.*, 327 U.S. 251, 264-65 (1946); *For Children, Inc. v. Graphics International, Inc.*, 352 F. Supp. 1280 (S.D.N.Y. 1972); accord, *Zenith Radio Corp. v. Hazeltine Research, Inc.*, 395 U.S. 100, 123 (1969). See pp. 86-87, *supra*.

92. See p. 102, *infra*. If, however, the trial court's generous application of the OEM royalty provision as part of the measure of damages be construed as a finding that an OEM market existed, that finding was not clearly erroneous, because the existence of the

Cases dealing with whether the fact of damage is adequately shown necessarily turn on their particular facts. Significantly, none of the six cases cited by Singer in support of its contention that it should be relieved of all liability by virtue of uncertainties resulting from its own inaction involved fact patterns at all similar to the case at bar.

Neither *Lowenschuss v. Kane*, 520 F.2d 255 (2d Cir. 1975) (S. Br. 46) nor *James Wood General Trading Establishment v. Coe*, 297 F.2d 651 (2d Cir. 1961) (S. Br. 47, 50) was a damage case at all. In *Lowenschuss*, this Court reversed the grant of summary judgment dismissing a class action against the maker of a non-consummated tender offer where the District Court had held that "the plaintiff class had suffered no damages cognizable in law," 520 F.2d 261. Since the issue arose on summary judgment and no evidence had been offered to prove the nature of the damages alleged to have been incurred, the case is not instructive on the issue of what amounts to sufficient proof of the fact

OEM market was separately shown. The parties contracted with reference to it *ante litem motam* (PX 60A, §3(c)(ii)) and the provision for a lower royalty for sales in that market supports the inference that greater volume was contemplated there than in the after market. Plaintiff, as the party prevailing below, is entitled to this inference. The only facts on which Singer relies to overcome this inference are two exhibits *not in evidence* (DX 335 for id and DX 337 for id, cited in S. Br. 51, note*) and testimony which its witness Bechthold (Tr. 7735-36, 7740-46; DX 10 at 4, cited in S. Br. 51, note**) repudiated on cross-examination (Tr. 7840-46). Bechthold admitted that at least one of the major auto manufacturers, Chrysler, was "not foreclosed" (Tr. 7732-33) to Perma in 1966. In the absence of evidence negating the existence of the OEM market, Singer tries to undermine the trial court's finding indirectly, by claiming that "Ford and Kelsey Hayes . . . tested and evaluated the Perma device in 1966 and rejected it" (S. Br. 51). However, the device submitted to Ford and Kelsey-Hayes was not the Perma device, the patents to which were assigned to Singer, but Romel's device, complete with transfer valve and restrictor valve, which Romel himself admitted was the cause of the unit's failure to function in the test referred to, *see* DX 336 at 1. The "rejection" of the device under these circumstances thus proves no more than the incompetence of Singer's chief engineer Romel.

of damage in any event.⁹³ *James Wood* was also a no-liability case in which the question of damages was never reached. A customer sued its broker for losses sustained as a result of the broker's failure to sell certain securities on the customer's behalf when the market price reached a specified level. This Court reversed a judgment in plaintiff's favor on the ground that the customer's instructions were discretionary, so that the broker had no contractual obligation to sell the shares and consequently was not in breach. Judge Medina's statement that "the customer suffered no provable damage", in context, clearly means that there was no liability, despite the financial loss plaintiff obviously suffered as a matter of fact.

In the four remaining cases cited by Singer, the fact of damage was in issue, but in none of them did the plaintiff make an evidentiary showing so substantial as that which supports the trial court's finding of damage here.

Simon v. New Haven Board & Carton Co. 516 F.2d 303 (2d Cir. 1975), was a derivative action under SEC Rule 10b-5, 17 C.F.R. §240.10b-5, in which plaintiffs claimed that the corporation's shares had been undervalued in a merger, but failed to establish how such undervaluation harmed the corporation on whose behalf the action was brought, as distinguished from individual exchanging shareholders. In fact, plaintiff did not even establish the fact of undervaluation. Although Singer cites this case for its concise statement of black-letter principles of law which are not in dispute, 516 F.2d at 306, its facts cast no light on the proper application of those principles here: what evidence is sufficient to show that a corporation is damaged by misrepresentations to its shareholders in connection with a merger has nothing to do with what evidence is sufficient to show that a patent owner is damaged

93. Interestingly, Singer cites to the portion of this Court's opinion discussing the difficulties the class plaintiffs might have, on remand, proving damages on their cause of action under the Williams Act, 520 F.2d at 268-69, and ignores the discussion of damages on the claim for breach of contract, which appeared to involve no uncertainty, *id.* at 267.

by its assignee's failure to develop and market the patented device.

Broadway Photoplay Co. v. World Film Corp., 225 N.Y. 104, 121 N.E. 756 (1919) (S. Br. 46, 47), is one of the few cases relied on by Singer which discusses the nature of the evidence held insufficient to establish the fact of damage. A theater owner sued to recover lost profits for breach of a contract to supply first-run feature films. The Court of Appeals of New York, after a jury trial resulting in a judgment for plaintiff, ordered a new trial on the ground that certain of the evidence on which plaintiff relied to prove damages was not sufficiently comparable, and therefore should have been excluded.⁹⁴ Plaintiff was not, of course, foreclosed, upon remand, from offering competent evidence to prove the fact of damage. With respect to the nature of that evidence, Judge (as he then was) Cardozo noted

"It is true, of course, that the conditions of a business affect the possibilities of proof and thus the measure of recovery. No formula can be framed, regardless of experience, to tell us in advance when approximate certainty may be attained. The rule of damages must give true expression to the realities of life."

225 N.Y. at 108. The measure of damages applied by the District Court in this case did precisely that.

In *Freund v. Washington Square Press, Inc.*, 34 N.Y.2d 379, 314 N.E. 2d 419, 357 N.Y.S.2d 857 (1974) (S. Br. 46), plaintiff did not even appeal the trial court's denial of

94. The proper measure of plaintiff's damage, the Court held, was the difference between receipts from "feature pictures of the first run and feature pictures of later runs," 225 N.Y. at 108. Plaintiff had introduced evidence tending to show that feature films were more profitable than non-features, which was not in issue; the evidence it offered with respect to first-run features related to theaters in different sections of the city, run under such different conditions of competition that the Court of Appeals found the comparison "misleading" for the jury, 225 N.Y. at 109-110.

recovery on his lost royalties theory; the opinion states only that plaintiff had failed to provide a "stable foundation for a reasonable estimate" of such royalties, 34 N.Y. 2d at 861, without discussing whether he offered any evidence at all.

Friedman v. Golden Arrow Films, Inc., 442 F.2d 1099 (2d Cir. 1971) (S. Br. 47, 48, 49, 50), is the only case cited by Singer which involved the issue of the existence of a market. Plaintiff there sought to recover loss of prospective profits that would have been realized in a joint venture to distribute children's films but it is impossible to determine from the opinion on appeal what evidence, if any, was before the trial court. The opinion states only that "it appears from the trial record that there is a serious doubt as to whether there is presently, or will be in the immediate future, a definable market for children's animated films," 442 F.2d at 1107, and remanded for, among other things, further findings on damages.⁹⁵

Singer points to no authority in which a defendant avoided liability in the face of the kind of proof of damage which was before the trial court here. Perma met its burden of proving the fact of damage by showing (1) the existence of a distributorship contract; (2) the opinion of a disinterested third party that market penetration would depend primarily on sales promotion effort; (3) defendant's own sales projections prepared in the ordinary course of business; (4) Perma's earlier marketing experience; and (5) Singer's willingness to make a substantial cash investment in order to enter the market. The trial court's finding on this issue cannot be said to be "clearly erroneous."

95. In an opinion by Judge Levet, sitting by designation, this Court did not even hold the trial court's findings clearly erroneous; rather, judgment was reversed because "[t]here are certain items of damages, awarded by the court below, with which this court does not agree," 442 F.2d at 1106. That case accordingly seems a rather slender precedent.

C. The District Court's Determination of the Amount of Damages Was Based on Reasonable Criteria Correctly Applied.

Singer next argues that the amount of damages awarded was excessive, attacking first the criteria applied by the District Court (S. Br. 51-59) and then the correctness of certain specific computations (*id.* 59-61). Neither argument amounts to a showing that the court's findings were clearly erroneous.⁹⁶

1. The Criteria Applied by the District Court Were Reasonable.

The criteria applied by the District Court were those established in *Story Parchment Co. v. Paterson Parchment Paper Co.*, 282 U.S. 555, 563 (1931) (Op. 47), still the leading case on determining the measure of damages where the precise amount of plaintiff's loss cannot be calculated. The Supreme Court said:

"Where the tort itself is of such a nature as to preclude the ascertainment of the amount of damages with certainty, it would be a perversion of fundamental principles of justice to deny all relief to the injured person, and thereby relieve the wrongdoer from making any amend for his acts. In such case, while the damages may not be determined by mere speculation or guess, it will be enough if the evidence show the extent of the damages as a matter of just and reasonable

96. Perma adduced evidence supporting a higher award and, although Perma is not pursuing its cross-appeal with respect to the amount of damages, it should be noted that the court resolved several issues respecting the computation of damages in Singer's favor. For example, the court's calculations (Op. 57-58) were limited to a 10-year period from December 21, 1964, whereas Perma urged that the appropriate period for measuring lost royalties from aftermarket sales commenced in 1966. In addition, as discussed elsewhere, note 92, *supra* and p. 102, *infra*, the court applied the lower OEM royalty provision to some of the sales projected by Kloby, although the inference is more probable that the parties were contemplating sales in the aftermarket, which would have resulted in larger royalties to Perma.

inference, although the result be only approximate. The wrongdoer is not entitled to complain that they cannot be measured with the exactness and precision that would be possible if the case, which he alone is responsible for making, were otherwise."⁹⁷

The trial court found that the best basis for computing Perma's damages was that on which Singer itself had relied when it determined to assume responsibility for marketing the device (Op. 51), namely the sales projections prepared by its own market expert, Kloby, in October, 1964 (Op. 53; DX 191; Tr. 6075). After considering various alternative criteria suggested by the parties (Op. 47-50), the court concluded that the "Kloby figures," in light of the purpose for which they were prepared and other contemporaneous evidence substantiating them, provided reasonable criteria for measuring damages (Op. 51-53). The record amply supports this finding.

Singer's reliance on the Kloby figures was supported both by his expertise and by contemporaneous independent substantiation of his conclusions. Kloby had extensive experience in market analysis. He joined Singer's Marketing Division in 1954 and possessed a Master's Degree in Business Administration, having majored in marketing (Tr. 5994-95). Moreover, he had been performing market analysis of new areas for Singer diversification since 1959 (Tr. 5995-97). By October, 1964, when he prepared his projections, Kloby had been studying the Perma device and considering the market for anti-skid devices for some nine months (*see* Tr. 5998). In making the projections, he considered factors which included then current passenger car registrations, annual new car production, the estimated size of the Canadian market, the endorsement of anti-skid

97. Although Justice Sutherland, in the antitrust context, spoke of torts, the teaching of this case is equally applicable to contract actions under the law of New York and has been so applied, *see, e.g., Autowest, Inc. v. Peugeot, Inc.*, 434 F.2d 556, 565 (2d Cir. 1970) (p. 98, *infra*); *For Children, Inc. v. Graphics International, Inc.*, 352 F. Supp. 1280, 1284 (S.D.N.Y. 1972) (p. 86, *supra*); *Spitz v. Lesser*, 302 N.Y. 490, 493, 99 N.E. 2d 540 (1951) (p. 99, *infra*).

control by safety councils and insurance company associations, evidence of interest shown by fleets and government agencies, existing distributor contracts and sales to date (DX 191 at 6). Independent substantiation for Kloby's projections was provided by the Hill Report, which agreed that "[p]rospects are indicated for a sales volume on the order of 160 thousand units during the next two years, depending on sales effort" (PX 57 at 3), and by Singer's distributor, Monitor Enterprises, which accepted Kloby's projection of 50,000 units in the first year as the basis for the minimum sales it was willing to guarantee (PX 64, §7 at 5).

The trial court's reliance on the Kloby figures is in turn supported by the fact that they "were accorded sufficient weight by the defendant to form a basis upon which Singer decided to take over marketing of the device." (Op. 51). In other words, the best indication of the reliability of Kloby's projections was that his superiors were willing to base their own recommendations that Singer take the risks involved in, and make the investment required by, the December contract squarely on Kloby's analysis of the potential benefit (DX 191 at 1 and PX 59, the Morris and Hough recommendations referred to in Op. 53). In addition Torello, a member of the corporate controller's staff, used them as the basis for his report to the corporate controller, including them in pro forma income figures he prepared in analyzing the financial aspects of the proposed Perna acquisition (Tr. 1790-91; PX 120).

In light of this evidence, the District Court found that the Kloby projections possessed the "indicia of reliability" recognized by this Court as sufficient in *Autowest, Inc. v. Peugeot, Inc.*, 434 F.2d 556, 566 (2d Cir. 1970) (Op. 52). In that case, an automobile distributor sued a manufacturer for wrongful termination of a distribution franchise, and the jury awarded damages for lost profits based on sales and income projections prepared by plaintiff's president and controller, 434 F.2d at 564-66. Although the Court of Appeals considered this evidence "weak", 434 F.2d at 566, it held it properly admitted because

"These projections were no mere 'interested guesses' prepared with an eye on litigation. Instead, they were the product of deliberation by experienced businessmen charting their future course . . . The projections were used to arrive at the conclusion to proceed, and they acted upon it."

Ibid. Here, where the projections in evidence were prepared and relied on by the *defendant's* executives, this reasoning applies *a fortiori*.

By contrast, none of the cases cited by Singer for the proposition that the Kloby figures were an improper criterion for measuring damages involved a remotely similar fact situation. In *Spitz v. Lesser*, 302 N.Y. 490, 99 N.E.2d 540 (1951), *modifying* 277 App. Div. 415, 100 N.Y.S.2d 558 (1st Dept. 1950) (S. Br. 52), the Court of Appeals of New York modified a judgment in the amount of six cents for breach of a contract to manufacture a toy carousel, and awarded damages based on the minimum royalty provision of the contract, a standard which the lower court had rejected, 277 App. Div. 415, 100 N.Y.S.2d 558. Although Singer apparently reads this case as supporting the idea that prospective royalties cannot be awarded in the absence of such a provision, the opinion of the Court of Appeals contradicts this reading:

"Since it is defendant's own wrong which has rendered it impossible for plaintiff to prove his damages with more certainty, he cannot complain of the alleged uncertainty.

* * *

"The most elementary conceptions of justice and public policy require that the wrongdoer shall bear the risk of the uncertainty which his own wrong has created." 98

98. 302 N.Y. at 494, quoting *Bigelow v. RKO Radio Pictures, Inc.*, 327 U.S. 251, 264-65 (1946). This view is also expressed in the dissenting opinion in the Appellate Division, 100 N.Y.S.2d at 560-561.

In all of the other cases relied on by Singer, plaintiffs either offered no proof of damages at all⁹⁹ or relied on evidence of sales of products or services not sufficiently comparable to the one in issue to provide a reasonable basis of calculation.¹⁰⁰

Singer seeks to apply this line of cases to the very dissimilar facts here presented by yet another repetition of its all-purpose claim that it could only have marketed a "reinvented" or "redesigned" device, S. Br. 46, 55-56. The engineering work remaining to be done as of December, 1964, before the device was ready for market did not amount to "redesign," as we have explained in detail, pp. 21-22, 24-25, *supra*. Singer's suggestion that the installation of a simple time-delay switch such as that used by major automotive manufacturers (pp. 21-22, *supra*) or an increase in the pressure capacity of the Perma-Vac component (Op. 23; pp. 24, 26, 42, *supra*) would have made any

99. *Freund v. Washington Square Press, Inc.*, 34 N.Y.2d 379, 382, 314 N.E.2d 419, 357 N.Y.S.2d 857, 859 (1974) (S. Br. 52-53); *Hewlett v. Caplin*, 275 App. Div. 797, 88 N.Y.S.2d 428 (1st Dep't 1949), *aff'd*, 301 N.Y. 591, 93 N.E.2d 492 (1950) (mem.) (S. Br. 53-54), where the reference to the lack of proof appears in the sentence immediately preceding that quoted at S. Br. 54. In *Freund*, an author sued for breach of a contract to publish a book, and at trial relied on three alternative theories of damages, including loss of royalties, the denial of which was not appealed from, 34 N.Y.2d at 382, 357 N.Y.S.2d at 859, discussed above, pp. 94-95.

100. *Gruber v. S-M News Co.*, 126 F.Supp. 442, 445-46 (S.D. N.Y. 1954) (S. Br. 52, 55) (past experience with respect to jigsaw puzzles and cleaning fluid not a reasonable basis for measuring damages for breach of contract to distribute Christmas cards); *Broadway Photoplay Co. v. World Film Corp.*, 225 N.Y. 104, 108-09, 121 N.E. 756 (1919) (S. Br. 52) (discussed above, p. 94); *Herman Schwabe, Inc. v. United Shoe Machinery Corp.*, 297 F.2d 906, 912 (2d Cir.), *cert. denied*, 369 U.S. 865 (1962) (S. Br. 55) (sales of machines in non-shoe market improper measure of plaintiff's damages flowing from defendant's monopoly of shoe market, especially where evidence offered was in form likely to mislead jury); *K & R Film Co. v. Erady*, 104 Misc. 667, 172 N.Y.S. 268 (App. T. 1st Dep't, 1918) (S. Br. 55) (evidence of receipts from showing defendant's film at non-comparable theaters under different conditions not a proper measure of plaintiff's damages for breach of contract to supply film).

material difference in the number of sales that could have been reasonably anticipated amounts to no more than grasping at straws.

Singer's variation on this theme, the argument that the engineering changes it failed to make would have affected either the cost or the price of the device (S. Br. 56), is equally specious. Cost of goods sold is irrelevant to damages here, since Perma's royalties were based not on Singer's profits but on the factory invoice price,¹⁰¹ which the parties fixed at \$51.00.

If, then, as Singer insists, "[a]ll that can safely be assumed about costs and selling price of the redesigned device is that they would have been *higher* than those of the 1964 device" (S. Br. 56, emphasis added), the application of the royalty percentage prescribed by the contract to such higher selling prices would only have resulted in higher royalties to Perma, and a higher amount of damages flowing from Singer's breach. If the District Court erred in failing to hypothesize a higher selling price of which Singer offered no evidence, the error was in Singer's favor.

Singer's final attack on the Kloby figures as a basis for measuring Perma's damages is the pretense that his projections have been "contradicted" by subsequent events (S. Br. 57-59). This argument is itself contradicted by the record.

"The fact that none of the superior [electronic] devices has ever been sold in the aftermarket" is first said by Singer to "demonstrate" the "invalidity" of Kloby's projec-

101. PX 60A, §3(c)(i)C, D at 5. In any event, the only evidence in the record as to the cost of the minor modifications to the hardware is to the contrary. For example, the cost of 50,000 Perma-Vac units would have been only \$71,000, a small portion of the 1.4 million cost of 50,000 complete anti-skid devices (*see* DX 603 at 2; PX 59 at 2; note 46, p. 42, *supra*). Therefore, even if it had been necessary to replace the entire component, the cost would have been negligible. Singer's suggestion that implementation of the Goor program would have increased its cost of goods sold (S. Br. 56) is specious, since the estimated cost of Goor's recommendations did not differ substantially from either Singer's own cost projections or the amount it actually spent before abandoning the device, *see* note 25 at p. 23, *supra*.

tions (S. Br. 57). The manufacturers of the electronic devices, however, have never made any effort to penetrate this market. Whatever their business reasons for concentrating on the OEM market, their absence from the aftermarket supports, rather than diminishes, the integrity of Kloby's projections, since Perma would have benefited from the lack of competition.

Singer's attack on the Kloby projections as inapplicable to sales in the OEM market (S. Br. 57-58) is misplaced, since the trial court did not use them as a basis for estimating lost royalties attributable to OEM market sales. Rather, because the rate of royalties applicable to such sales was *lower* than that prescribed for aftermarket sales, the court gave Singer the benefit of the assumption—to which it probably was not entitled—that Singer would have made at least some of its sales in that market which would have produced smaller payments to Perma. If that assumption was erroneous, the error was in Singer's favor.¹⁰²

Nor was it error, as Singer contends (S. Br. 56) to use sales projections covering a five-year period to measure the damages flowing from breach of a ten-year contract. The willingness of Singer's executives to assume the obligations of a ten-year contract on the basis of projected sales for the first five years supports the inference that the second half of the period was expected to be, at the very least, no less favorable. Any uncertainty in this respect is clearly one that should be borne by the wrongdoer, *Story Parchment Co. v. Paterson Parchment Paper Co.*, 282 U.S. 555, 563 (1931); *accord*, *Zenith Radio Corp. v. Hazeltine Research*,

102. The trial court's allocation of half the 1968 and 1969 sales to the less profitable OEM market resulted in calculations of lost revenues of \$807,773.81 in 1968 and \$838,467.43 in 1969, based on projected sales of 210,907 and 218,921 units, respectively, at the "compromise" royalty of 7½%, Op. 57, 56. If Singer is correct that none of its expert's projections should have been allocated to the OEM, then the 10% royalty rate should have been applied. If all the sales projected for 1968 and 1969 must be considered aftermarket sales, Perma lost royalties of \$1,075,625.70 in 1968 and \$1,116,497.10 in 1969 (210,907 and 218,921 x 10% of invoice price), and the total damage award should have been \$5,879,305.50, plus interest.

Inc., 395 U.S. 100, 123-24 (1969); *Bigelow v. RKO Radio Pictures, Inc.*, 327 U.S. 251, 264-65 (1946); *Autowest, Inc. v. Peugeot, Inc.*, 434 F.2d 556, 565 (2d Cir. 1970); *For Children, Inc. v. Graphics International, Inc.*, 352 F.Supp. 1280, 1284 (S.D.N.Y. 1972); *Spitz v. Lesser*, 302 N.Y. 490, 99 N.E. 2d 540 (1951).¹⁰³

2. Singer's Attacks on the District Court's Computations Are Without Merit.

Singer launches its fifteen-page argument on damages from the position that no damages at all should have been awarded, retreats through various alternatives of diminishing materiality, and contents itself to conclude with the speculation that the invoice price on which Perma's royalties were based might have been reduced from \$51.00 to \$48.50—approximately 5%—during the term of the contract. Singer attacks five separate components of the District Court's computations (S. Br. 59-61); none of these arguments is supported by the record.

First, Singer's argument that the award of damages should be reduced by the portion of lost royalties for 1968 and 1969 computed at the OEM rate, repeated for the third

103. The two elderly cases relied on by Singer (S. Br. 56) do not require a contrary result. In *Isaac H. Blanchard Co. v. Rome Metallic Bedstead Co.*, 184 App. Div. 187, 171 N.Y.S. 890 (1st Dep't 1918), the Appellate Division affirmed dismissal of a cause of action for breach of a provision of a lease which purported to require a landlord to purchase its electric power requirements from a tenant. The lower court found the lease provision too indefinite to amount to a contract, 171 N.Y.S. at 893. It does not appear that either party offered any evidence whatever of what the parties contemplated the profits, if any, from the venture would be, for any portion of the 20-year term. *Walter Jander, Inc. v. Baker*, 229 App. Div. 679, 243 N.Y.S. 173 (1st Dep't 1930), held only that a plaintiff seeking to recover lost profits on the basis of past earnings figures must show that business conditions continued the same after termination of the contract. Here, when Singer entered a ten-year contract on the basis of Kloby's five-year projections, its executives were obviously satisfied that the assumptions Kloby used were applicable to the entire term, and the court did take prospective changes in business conditions over the entire term into account, see Op. 56-57 (increased auto registration).

time at S. Br. 59, has already been discussed, pp. 96, 102, *supra*.

Second, the suggestion that the court should not have taken market expansion into account because Kloby had already done so (S. Br. 59) is based on a misreading of the Kloby memorandum. Although "annual new car production" was one of a list of items Kloby said he "considered" (DX 191 at 6), his *figures* do not reflect any adjustment resulting from that consideration, but project constant sales of the anti-skid device during a period of increasing auto registration.¹⁰⁴

Third, the suggestion that lost royalties should have been computed from April, 1966, instead of January because "Goor's 15 month development program" would have delayed sales (S. Br. 59-60) overlooks Goor's testimony that all of the steps he recommended could have been completed in 12 months (Tr. 2541-2), *i.e.*, by January, the date when the parties contemplated Singer would have the product ready for market (*see* p. 23, *supra*). The court, judging Goor's credibility, was not required to reject this testimony, as Singer's argument seems to assume.

Fourth, Singer's argument that Perma's royalties were intended to be computed on a factory invoice price from which the federal excise tax had been deducted is supported only by references to self-serving internal communications (S. Br. 60). The actual contract between Perma and Singer, however, provides for the deduction of certain taxes only "to the extent included in such invoice price" (PX 60A, §3(a)). There is no evidence in the record that the excise tax was in fact included in the \$51.00 invoice price on which the court measured damages; the Monitor contract (PX 64) is ambiguous, and Singer made no attempt to resolve that ambiguity by offering actual invoices. It therefore cannot now complain that the ambiguity was construed in a manner it never attempted to rebut.

104. Another of the factors Kloby considered in 1964 was "passenger car registrations—70 million," DX 191 at 6, but by 1969 this figure had increased to 86.8 million, and by 1972 to 96.4 million, PX 140 at 2.

Singer's last argument is that Perma's lost royalties should have been computed on the assumption that the invoice price would have dropped from \$51.00 to \$48.50 after a year (S. Br. 61). Singer's citations, however, are to internal pro forma income statements the underlying assumptions of which are nowhere revealed in the record. The court was correct in declining to consider evidence of such a speculative and totally self-serving character.

In summary, none of Singer's arguments supports the conclusion that the trial court's award of damages was clearly erroneous.

Conclusion

The Judgment Should Be Affirmed.

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December 8, 1975

Respectfully submitted,

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